


DRAFT
Access Justification Report
Exit 113 – Interstate 95
Augusta, Maine

Prepared for:

Maine Department of Transportation
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Augusta, ME 04333-0016

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Executive Summary

Introduction

The Maine Department of Transportation (MaineDOT) in cooperation with the City of Augusta, the Augusta Board of Trade (ABOT) and the Kennebec Valley Chamber of Commerce (KVCC) partnered to undertake a comprehensive traffic operational study of the Interstate 95 (I-95) Exit 112/113 area in Augusta. This report is to document the results of this study as well as satisfy the Federal Highway Administration (FHWA) requirements for a new, added, or revised access point to the Interstate System. Section 111 of Title 23, U.S.C., provides that all agreements with a State Transportation Department for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from, the project in addition to those approved by the FHWA in the plans for such project, without the prior approval of the FHWA.

This study analyzes the engineering feasibility and defines the required improvements best suited to meet the current and future regional needs for the Exit 112 and Exit 113 areas. This Interchange Justification Report (IJR) is the product of the combined Exit 112 and Exit 113 studies and will be submitted to FHWA by MaineDOT for conceptual approval. Final approval of the IJR will be requested with the submission of the Environmental Assessment (EA) decision.

The area surrounding Exits 112 and 113 has experienced substantial growth in recent years and will continue to grow as the City of Augusta has established the area from the Augusta Civic Center, along Route 8/11/27 (Civic Center Drive) to Old Belgrade Road as an Economic Growth Zone. The intent of the Economic Growth Zone is to focus new commercial, industrial, office and medical facility growth in a designated area of Augusta. Additionally, Augusta's land use plan describes the area on Old Belgrade Road adjacent to MaineGeneral's Harold Alfond Cancer Center as a focal point for the development of medical facilities. MaineGeneral Medical Center has announced its intention to locate a new inpatient regional hospital adjacent to the cancer center. This development is contingent upon the filing and approval by the State Department of Health and Human Services of a Certificate of Need (CON) to be submitted in December 2009.

In addition to MaineGeneral's plans, MaineDOT has approved Traffic Movement Permit Applications for approximately 705,000 square feet of development in the Study Area and there is the potential of another 1.78 million square feet of further development within the Economic Growth Zone including retail, service, office, storage and warehousing. This square foot total does not include the facilities that may be required to accommodate the University of Maine at Augusta's plan to double its enrollment in the next twenty years. Seven Hundred and five thousand square feet of this potential development has already received traffic movement permits from the MaineDOT including future expansions of the Commerce Center and the Marketplace retail center. The granting of future traffic movement permits depends largely on upgrading the area transportation system to accommodate existing and future development needs.

Study Area

The study area is generally bounded by Townsend Road, Old Belgrade Road, and Civic Center Drive / Belgrade Road. The study area includes I-95 and the interchanges and adjacent intersections at Civic Center Drive (Exit 112) and State Route 3 Connector (Exit 113). Figure ES-1 on the following page shows the location of the study area.



Figure ES 1. Study Area

Purpose and Need

The following purpose and need statement was created based on discussions with the City of Augusta, MaineDOT, and FHWA. The purpose of the study has been identified by these stakeholders as:

- Enhance public safety;
- Improve regional mobility while enhancing local access;
- Support local and regional economic viability and growth; and
- Comply with the vision and strategies identified in the Augusta Comprehensive Plan.

The needs to be met by this project are:

Public Safety

1. Three High Crash Locations impede traffic in the vicinity of Exit 112 and one at the intersection of Old Belgrade Road and Bog Road;
2. Hazardous travel conditions due to local traffic on I-95 between Exits 113 and 112;
3. Impaired through service capacity on Interstate 95;
4. Impaired emergency response times for fire, police and ambulance due to poor levels of service in the vicinity of Exit 112; and
5. Lack of direct alternative routes for emergency response vehicles to the Exit 112 area and regions to the north on Route 27.

Mobility and Access

1. Facilitate the safe movement of people and goods within and through the Study Area;
2. Current east-west through traffic using Route 27 west of I-95 and on Routes 3 and 17 east of I-95 must travel through congested built up sections of Augusta that presently operate at poor levels of service;
3. Current congestion along Route 27 between Townsend Road and Old Belgrade Road significantly impede left turn movements into and out of driveway access points and contribute to the roadways poor level of service [LOS D through F];
4. Improve the transportation connections within the city of Augusta and to and from regional markets served by the existing transportation network;
5. Route 3 between the Kennebec River and the Interstate has substantial reserve capacity but is not designed to mitigate the lack of capacity on adjacent Route 27; and
6. Preserve through traffic mobility on I-95.

Local and Regional Economic Viability and Growth

1. Compliment existing and future economic development opportunities in the study area; and
2. Enhance the marketability of the study area's existing and potential economic development as designated in the City of Augusta's Comprehensive Plan.

Study Methodology

The study methodology included four major steps:

1. Analysis of existing conditions within the study area;
2. Analysis of future conditions without improvements (No Build);
3. Analysis of future conditions with improvements; and
4. Summarized report findings

The turning movement counts, collected by MaineDOT and Gorrill-Palmer Consulting Engineers, Inc. in 2007-2008, were used to develop Midday peak hour (12:00 PM to 1:00 PM) and PM peak hour (4:30 PM to 5:30 PM) traffic volume networks for each alternative. The Midday and PM time periods were identified as the overall busiest time periods, most likely due to the level of commercial and retail development in the area. Traffic analyses were conducted using projected traffic volumes to assess the potential impact of each alternative on traffic operations on I-95 at Exit 112 and Exit 113 and on the Route 8/11/27 corridor within the study area.

The year 2028 was selected as the future analysis year because it is consistent with the future land use expansion timeframe; includes the estimated traffic impacts from the expected development within the study area and provides a twenty year planning horizon to account for anticipated growth from within and outside of the study area.

A concept for each alternative was developed to delineate new roadways and ramps that would need to be constructed and existing infrastructure that would need to be modified to accommodate existing and future traffic. These concepts were used to develop construction costs estimates. In addition, they were used to conduct a planning level environmental analysis based on readily available literature, known databases, and map research.

Existing Conditions

The major roadways within the study area include I-95, Civic Center Drive (Exit 112), Route 3 Connector (Exit 113), Belgrade Road, and Old Belgrade Road. Intersection capacity analyses were conducted on the following five study area intersections:

- Civic Center Drive at Garden Court and Community Drive;
- Civic Center Drive at I-95 northbound on/off-ramps;
- Civic Center Drive at I-95 southbound on/off-ramps;
- Civic Center Drive at Darin Drive; and
- Civic Center Drive at Leighton Road and Belgrade Road.

All five intersections operate at level of service (LOS) D or better in the Midday and PM peak hour, except the following intersection approaches:

- Civic Center Drive at Darin Drive - The Darin Drive approach currently operates at LOS E during the PM peak.
- Civic Center Drive at I-95 northbound on/off-ramps - The Civic Center Drive southbound left-turn approach currently operates at LOS E during the PM peak.
- Civic Center Drive at I-95 southbound on/off-ramps - The Civic Center Drive southbound approach currently operates at LOS F operations during the PM peak.

The traffic modeling runs showed that the close proximity between the intersections and driveways along Civic Center Drive causes some links to fill up and spill over into the adjacent intersections and driveways. Excessive queue lengths with driveway blocking were reported at the Civic Center Drive southeast approach from the I-95 southbound on/off-ramp. In addition, queue lengths of over 200 feet were reported at the Darin Drive approach to Civic Center Drive. These queues may cause additional degradation of the LOS that is not reflected in the calculations.

The crash data analyzed for this study is from January 2005 through December 2007. The data identified the following High Crash Locations (HCLs): (1) Civic Center Drive at I-95 northbound on/off-ramp, (2) Civic Center Drive at I-95 northbound off-ramp to Civic Center Drive northbound, (3) Civic Center Drive from Darin Drive to I-95 southbound on/off-ramp, and (4) Old Belgrade Road at Bog Road. An all-way stop control was implemented in 2007 at the intersection of Old Belgrade at Bog Road as mitigation under MaineGeneral Cancer Center's Traffic Movement Permit. None of the crashes occurred after the all-way stop was implemented so it appears that the Old Belgrade Road and Bog Road HCL has been corrected by this action. MaineDOT will continue to monitor this location.

The predominant trend in crashes is rear end and angle collisions attributed to either failure to yield or driver inattention during times of heavy traffic congestion.

I-95 within the study area was constructed 45 years ago; therefore, elements of its design do not meet current design requirements as contained in *A Policy on Geometric Design of Highway and Streets*, 2004, by the American Association of State Highway and Transportation Officials (AASHTO) or the Maine Department of Transportation's *Highway Design Guide*. Obsolete design features based on current criteria are inadequate merge and diverge distances provided at the Exit 112 ramp junctions with the exception of the I-95 northbound on-ramp which was reconfigured and extended as an auxiliary lane as part of the Exit 113 construction. Updating the Exit 112 ramps to current design standards was not reviewed as it is outside the scope of this study.

The Exit 113 ramps currently meet today's design standards and any future construction changes to Exit 113 would not reduce the effectiveness of the interchange to satisfy the design standards.

No Build Conditions

The No-Build Alternative assumes that no further construction or major reconstruction would occur and the present level of maintenance would continue within the time period of the study. Maintenance activities could include resurfacing, traffic lane markings, and signing, spot shoulder and drainage improvements.

By 2028, No Build peak hour intersection total entering volumes associated with intersections on Civic Center Drive are projected to increase by 35 percent to 196 percent in the Midday peak and 37 percent to 163 percent in the PM peak. As a result of these increases, Civic Center Drive in the vicinity of the I-95 Exit 112 ramps is forecasted to exceed capacity resulting in gridlock. Mainline I-95 through traffic will be disrupted by Exit 112 northbound and southbound off-ramp queuing.

Transportation Systems Management

Under the MaineDOT Traffic Movement Permit process numerous Transportation Systems Management (TSM) projects on Civic Center Drive have been completed to mitigate development traffic impacts including:

- Installation of full actuated traffic signals at Leighton Road and at the I-95 Exit 112 northbound off-ramp;
- Intersection modifications to I-95 southbound and northbound ramps and Garden Court and Community Drive to provide additional lanes;
- Installation of a 4 foot wide raised median between the I-95 Exit 112 northbound ramps and Garden Court for access management;
- Installation of overhead lane designation signs; and
- Optimization of the timing for the coordinated traffic signal system.

The projected traffic increase at Exit 112 cannot be maintained by additional TSM strategies; therefore, the TSM Alternative would not be a viable solution to accommodate future traffic needs in the study area.

Transportation Demand Management

The development of transit improvement alternatives is outside the scope of this study; however the Kennebec Valley Transit Service is evaluating this area in depth and will be releasing the study results in the fall 2009. The results of that study will be reviewed and incorporated by MaineDOT into this IJR by technical memorandum, as appropriate, once it is completed. Tom Crikelair Associates' report, in the Appendix I, identified that the proposed Exit 113 enhancements could provide greater viability for transit compared to an existing or enhanced Exit 112 because the Exit 113 enhancements:

- Provide a direct link between I-95 and Old Belgrade Road resulting in fewer miles traveled for the Waterville-Augusta bus route and
- The proposed link would reduce running time by five minutes for the Waterville-Augusta bus route.

Expanding transit service in the study area is projected to remove 16 to 30 local vehicles and 25 to 30 Waterville commuter vehicles in the Midday and PM peak hours. After a new regional hospital is developed on Old Belgrade Road, an additional 30 to 40 Waterville commuter vehicles could be eliminated during the Midday and PM peak hours.

The operations benefits of expanding transit service into the study area are not substantial enough to suggest transit as a standalone solution for the area. As it does have the potential to reduce vehicle demand in the area, it should continue to be considered as a complementary alternative to a capacity improvement alternative.

Alternatives Considered

Exit 113

Two alternatives were considered for this location. Both alternatives will modify Exit 113 from a directional interchange to a full interchange and will maintain the I-95 northbound to eastbound Route 3 free flow movement.

Alternative 1

This alternative replaces the current trumpet ramp design with a hybrid parclo interchange using the existing loop ramp in the northwest quadrant and providing a new loop ramp in the northeast quadrant. This alternative consists of a signalized intersection on the I-95 southbound ramp terminal and an unsignalized intersection on the I-95 northbound ramp terminal. With the 2028 volume projections, the northwesterly intersection requires four lanes on all approaches. This configuration includes a left turn, two through lanes, and a right turn for the Route 3 Connector approaches and dual lefts, a through, and a right turn lane for the I-95 southbound ramp and Old Belgrade Road approaches. The concept is shown in Figure 15.

Alternative 2

This alternative replaces the current trumpet ramp design with two-lane roundabouts, one at each of the northbound and southbound I-95 ramp termini. The Route 3 Connector would be configured as single lanes in each direction with flares to two lanes at the roundabout intersections. The northbound roundabout would have four legs including entrances and exits for eastbound and westbound Route 3, as well as an entrance for the northbound off-ramp and an exit for the northbound on-ramp. The southbound roundabout would have four legs including entrances and exits for Route 3, Old Belgrade Road, and the southbound on/off-ramp. The concept is shown in Figure 16.

The intersections will operate at a LOS A with overall delay of less than 6 seconds. The maximum queue distance on the corridor is expected to be 125 feet at the easterly roundabout Route 3 northbound approach. The southbound I-95 off-ramp has the least residual capacity with failure occurring with 18 percent additional traffic beyond the 2028 projections. The other roundabout entries along this corridor have residual capacities of up to 22 percent beyond the 2028 projections.

Connection to Route 8/11/27

A full movement interchange at Exit 113 onto Old Belgrade Road could not be constructed without upgrading the immediate roadway network around the proposed interchange to accommodate the increase in traffic volume that such an interchange would generate. The two alternatives include: (1) the upgrade of Old Belgrade Road and (2) a new highway connector. Both alternatives would be two lanes wide and built to arterial standards.

Alternatives 1A and 2A

Alternatives 1A and 2A involve an upgrade of Old Belgrade Road between the modified Exit 113 interchange and Route 8/11/27. The alternative corridor is approximately one mile long, with the entire

corridor consisting of roadway reconstruction or rehabilitation (i.e., there is no portion on new alignment). The existing access points would remain but additional access rights would be acquired with full controlled access approximately 300 feet from the modified I-95 southbound ramp terminus. These alternatives would require intersection improvements to Bog Road / Old Belgrade Road, Old Belgrade Road / Belgrade Road, Bog Road / Belgrade Road. The concept for the upgrade of Old Belgrade Road is shown in Figure 17.

Alternatives 1B and 2B

The Alternatives 1B and 2B corridor is approximately one-half mile long. The entire one-half mile corridor would consist of roadway construction on new alignment. It would originate from the modified Exit 113 interchange and terminate northwesterly at Route 8/11/27 in the vicinity of Commerce Drive. These alternatives would be a partial controlled access highway with a limited number of openings for future public access. The concept for the new highway connector is shown in Figure 18.

Exit 112

Two alternatives were considered for this location: (1) traffic signals and (2) roundabouts. Both alternatives would require the widening of the I-95 overpass bridges to accommodate six lanes of traffic on Civic Center Drive.

Alternative 3

This alternative would require a six-lane roadway corridor from Darin Drive to the Civic Center Drive and I-95 northbound on/off-ramp terminal with additional widening at the intersections for exclusive left-turn and right-turn lanes. Under this alternative, left turns from Darin Drive to Civic Center Drive would be eliminated and relocated to Leighton Road. The concept for the traffic signals is shown in Figure 19.

With Alternative 3 Civic Center Drive at the Leighton Road, I-95 southbound on/off-ramp, and the Community Drive and Garden Street intersections are projected to operate at an overall LOS C or better for the 2028 Midday peak hour and PM peak hour. However, some approaches are projected to operate at LOS E/F during both peak hours. The Darin Road intersection is projected to operate at an overall LOS D for the Midday peak and LOS F for the PM Peak. I-95 northbound on/off-ramp intersection is projected to operate at an overall LOS E for the Midday peak and LOS C for the PM peak.

In 2028, Alternative 3 queuing along Civic Center Drive is projected to be almost half a mile to the northwest of Darin Drive during the PM peak hour and a quarter mile to the southeast of Darin Drive during the Midday peak hour. This queue extends to the I-95 southbound on/off-ramps resulting in vehicle queuing of the I-95 southbound off-ramp to the I-95 mainline at times. The queuing for southeasterly through traffic at Leighton Road is anticipated to approach 700 feet. As with the 2008 existing conditions, these queues may cause degradation of the LOS that is not reflected in the calculations.

Alternative 4

Alternative 4 would require the construction of four roundabouts on Civic Center Drive between Garden Court and Darin Drive. The roundabout alternative would require a six-lane roadway corridor from Darin Drive to the I-95 northbound on/off-ramp terminal. A two-lane roadway section (one lane in each direction) is required from the I-95 northbound on/off-ramp terminal to Townsend Road. By including roundabouts, center medians could be incorporated to a greater extent than the previous concept while still allowing drivers to travel to and from each direction. The concept for the roundabouts is shown in Figure 20.

The intersections are expected to operate at a LOS A with overall delay of less than 10 seconds. The maximum queue distance with the roundabout alternative is expected to be 100 feet. Residual capacity of each intersection was calculated as the percentage increase in total entering traffic beyond the 2028 projection that would result in a leg operating at LOS E. Increases were assumed to occur equally on all legs until one leg failed. In this scenario, the I-95 southbound off-ramp entry has the least residual capacity with failure occurring with 9 percent additional traffic beyond the 2028 Midday projections. The other roundabout entries along this corridor have residual capacities of up to 37 percent beyond the 2028 traffic projections.

Preliminary Environmental Constraints

Planning level environmental studies have been conducted for this study. The preliminary impacts are based primarily upon readily available literature, known databases, map research, and limited fieldwork. The following are anticipated resources and potential areas of concern within the study area:

- Wetlands;
- Water quality of Stone Brook which drains to Bond Brook;
- Public water wells;
- Federal Emergency Management Agency (FEMA) 100-year floodplain, Zone A;
- Atlantic salmon;
- Uncontrolled Petroleum and Hazardous Waste;
- Vernal pools; and
- Wildlife.

Preliminary Construction Costs

The preliminary project costs are planning-level and are based on 2008 dollars as presented in Table ES-1. The preliminary costs reflect construction cost and do not include design, right of way acquisition, utility relocation, environmental mitigation if any, construction engineering, and maintenance costs over the life of pavement and structures.

Table ES-1. Preliminary Construction Costs

	Exit 113 Build*				Exit 112 Build	
	Alternative 1 Traffic Signals	Alternative 2 Roundabouts	Alternative 1A and 2A Upgrade Old Belgrade Road	Alternative 1B and 2B New Highway Connector	Alternative 3 Traffic Signals	Alternative 4 Roundabouts
Construction Costs (million 2008\$)	\$11.0	\$4.9	\$3.5	\$8.3	\$21.5	\$26.5

* Total Construction Cost for Exit 113 is determined by adding the cost of Alternative 1 or Alternative 2 to the cost of Alternative 1A or 1B or 2A or 2B.

Conclusions / Recommendations

As demonstrated, the Route 8/11/27 corridor and Exit 112 interchange ramps are currently experiencing operational and safety issues due to chronic traffic congestion. The congestion driven safety issues are exacerbated by the local access in close proximity to the series of signals along the corridor. It is anticipated that the congestion will intensify with the current and proposed level of planned development.

Based on the analyses conducted in this IJR it is recommended the following alternatives be forwarded to the NEPA process.

1. Develop Exit 113 into a full service interchange with a connection from Route 3 to Route 8/11/27. The access for the new Route 3 extension be planned to complement existing and projected development, as well as, have limited access control to promote safety and mobility both locally and regionally. In addition, it will provide system redundancy for the local and regional transportation system which is currently inadequate.
2. Roundabouts at Exit 113 are recommended as the preferred type of intersection at the ramps as depicted in Section IV. D. and in Figure 16. Based on the modeling, it is expected that the roundabouts will provide better mobility and safety performance than the traditional signalized intersections.

In addition to the Exit 113 modification, the following safety improvement is recommended at the Exit 112 interchange:

Reconfigure the southbound on-ramp as a parallel taper ramp to correct the existing geometric deficiencies.

I. Introduction

A. Study Background

The Maine Department of Transportation (MaineDOT) in cooperation with the City of Augusta, the Augusta Board of Trade (ABOT) and the Kennebec Valley Chamber of Commerce (KVCC) partnered to undertake a comprehensive traffic operational study of the Interstate 95 (I-95) Exit 112/113 area in Augusta. This report is to document the results of this study as well as satisfy the Federal Highway Administration (FHWA) requirements for a new, added, or revised access point to the Interstate System. Section 111 of Title 23, U.S.C., provides that all agreements with a State Transportation Department for the construction of projects on the Interstate System shall contain a clause providing that the State will not add any points of access to, or exit from, the project in addition to those approved by the FHWA in the plans for such project, without the prior approval of the FHWA.

This study analyzes the engineering feasibility and defines the required improvements best suited to meet the current and future regional needs for the Exit 112 and Exit 113 areas. This Interchange Justification Report (IJR) is the product of the combined Exit 112 and Exit 113 studies and will be submitted to FHWA by MaineDOT for conceptual approval. Final approval of the IJR will be requested with the submission of the Environmental Assessment (EA) decision.

The area surrounding Exits 112 and 113 has experienced substantial growth in recent years and will continue to grow as the City of Augusta has established the area from the Augusta Civic Center, along Route 8/11/27 (Civic Center Drive) to Old Belgrade Road as an Economic Growth Zone. The intent of the Economic Growth Zone is to focus new commercial, industrial, office and medical facility growth in a designated area of Augusta. Additionally, Augusta's land use plan describes the area on Old Belgrade Road adjacent to MaineGeneral's Harold Alfond Cancer Center as a focal point for the development of medical facilities. MaineGeneral Medical Center has announced its intention to locate a new inpatient regional hospital adjacent to the cancer center. This development is contingent upon the filing and approval by the State Department of Health and Human Services of a Certificate of Need (CON) to be submitted in December 2009.

In addition to MaineGeneral's plans, MaineDOT has approved Traffic Movement Permit Applications for approximately 705,000 square feet of development in the Study Area and there is the potential of another 1.78 million square feet of further development within the Economic Growth Zone including retail, service, office, storage and warehousing. This square foot total does not include the facilities that may be required to accommodate the University of Maine at Augusta's plan to double its enrollment in the next twenty years. Seven Hundred and five thousand square feet of this potential development has already received traffic movement permits from the MaineDOT including future expansions of the Commerce Center and the Marketplace retail center. The granting of future traffic movement permits depends largely on upgrading the area transportation system to accommodate existing and future development needs.

B. General Description of Study Area

The study area is generally bounded by Townsend Road, Old Belgrade Road, and Civic Center Drive / Belgrade Road. The study area includes I-95 and the interchanges and adjacent intersections at Civic Center Drive (Exit 112) and State Route 3 Connector (Exit 113). Figure 1 shows the location of the study area.

Although this report is based on the proposed modification of the existing Exit 113 interchange, one of the driving reasons for this analysis and the need to provide the proposed modifications to Exit 113 are the transportation issues currently being experienced at Exit 112 to the south. Therefore, the study area for this report is based on both the existing Exit 113 and the existing Exit 112 area that is currently at capacity. Additionally, the logical terminus for the study area boundary is based upon several other factors, namely:

- Current and future safety and operation issues of the transportation network serving the local service area;
- Regional traffic flow that serves a variety of businesses and communities within the area; and
- Current and future land use development within the study area that influences traffic operations.

C. Purpose and Need

The following purpose and need statement was created based on discussions with the City of Augusta, MaineDOT, and FHWA. The purpose of the study has been identified by these stakeholders as:

- Enhance public safety;
- Improve regional mobility while enhancing local access;
- Support local and regional economic viability and growth; and
- Comply with the vision and strategies identified in the Augusta Comprehensive Plan.



Figure 1. Study Area

The needs to be met by this project are:

Public Safety

1. Three High Crash Locations impede traffic in the vicinity of Exit 112 and one at the intersection of Old Belgrade Road and Bog Road;
2. Hazardous travel conditions due to local traffic on I-95 between Exits 113 and 112;
3. Impaired through service capacity on Interstate 95;
4. Impaired emergency response times for fire, police and ambulance due to poor levels of service in the vicinity of Exit 112; and
5. Lack of direct alternative routes for emergency response vehicles to the Exit 112 area and regions to the north on Route 27.

Mobility and Access

1. Facilitate the safe movement of people and goods within and through the Study Area;
2. Current east-west through traffic using Route 27 west of I-95 and on Routes 3 and 17 east of I-95 must travel through congested built up sections of Augusta that presently operate at poor levels of service;
3. Current congestion along Route 27 between Townsend Road and Old Belgrade Road significantly impede left turn movements into and out of driveway access points and contribute to the roadways poor level of service [LOS D through F];
4. Improve the transportation connections within the city of Augusta and to and from regional markets served by the existing transportation network;
5. Route 3 between the Kennebec River and the Interstate has substantial reserve capacity but is not designed to mitigate the lack of capacity on adjacent Route 27; and
6. Preserve through traffic mobility on I-95.

Local and Regional Economic Viability and Growth

1. Compliment existing and future economic development opportunities in the study area; and
2. Enhance the marketability of the study area's existing and potential economic development as designated in the City of Augusta's Comprehensive Plan.

D. Federal Highway Administration Policy Criteria

FHWA has adopted a series of eight policy issues for new or revised access points in the Interstate Highway System. These policies were published in the Federal Register, Volume 63, Number 28, dated February 11, 1998. This series of policies is intended to protect the capacity and safety of travel along the Interstate System by maintaining the highest level of service in terms of safety and mobility. Adequate control of access is critical to providing such service. These eight criteria consist of the following:

1. Existing Facilities
2. Transportation System Management
3. Operational Analysis
4. Access Connections and Design
5. Transportation Land Use Plans
6. Comprehensive Interstate Network Study
7. Coordination with Transportation Systems Improvements
8. Status and Information on the Planning and National Environmental Policy Act (NEPA) Processes

This document is included in Appendix J.

E. Study Methodology

The study methodology included four major steps:

1. Analysis of existing conditions within the study area;
2. Analysis of future conditions without improvements (No Build);
3. Analysis of future conditions with improvements; and
4. Summarize report findings.

The turning movement counts, collected by MaineDOT and Gorrill-Palmer Consulting Engineers, Inc. in 2007-2008, were used to develop Midday peak hour (12:00 PM to 1:00 PM) and PM peak hour (4:30 PM to 5:30 PM) traffic volume networks for each alternative. The Midday and PM time periods were identified as the overall busiest time periods, most likely due to the level of commercial and retail development in the area. Traffic analyses were conducted using projected traffic volumes to assess the potential impact of each alternative on traffic operations on I-95 at Exit 112 and Exit 113 and on the Route 8/11/27 corridor within the study area.

The year 2028 was selected as the future analysis year because it is consistent with the future land use expansion timeframe; includes the estimated traffic impacts from the expected development within the study area and provides a twenty year planning horizon to account for anticipated growth from within and outside of the study area.

A concept for each alternative was developed to delineate new roadways and ramps that would need to be constructed and existing infrastructure that would need to be modified to accommodate existing and future traffic. These concepts were used to develop construction costs estimates. In addition, they were used to conduct a planning level environmental analysis based on readily available literature, known databases, and map research.

F. Agency Coordination and Public Involvement

The following meetings were held during the preparation of this study:

- April 28, 2008 informational meeting at Augusta City Hall: The meeting explained the study process and presented the draft purpose and need statement
- April 30, 2008 study outline meeting at Augusta Board of Trade (ABOT) office: The meeting outlined the study process and the potential benefits
- May 12, 2008 informational meeting at Augusta City Hall: The meeting presented the existing conditions and draft purpose and need statement
- February 5, 2009 study update and next steps at MaineDOT office: The meeting presented the existing / future traffic conditions and discussed possible strategies for next steps
- February 12, 2009 study update meeting at ABOT meeting: The meeting presented the existing / future traffic conditions and reasonable alternatives
- February 26, 2009 informational meeting at Augusta City Hall: The meeting presented the existing / future traffic conditions and reasonable alternatives

II. Existing Conditions

This chapter describes existing conditions in the study area. This includes a description of the existing transportation network, current safety issues, traffic volumes, geometric deficiencies, and land uses as well as a description of environmental resources.

A. Existing Transportation Network

Roadways

The following sections present the characteristics of the major roadways through the study area.

Interstate I-95

I-95, the interstate highway through the study area, is a north-south controlled access facility that runs in a general east/west direction through Augusta with two lanes of travel in each direction within approximately 300 feet of right-of-way. The posted speed limit is 65 miles per hour (mph). Figure 2 shows the I-95 existing configuration in the study area.

Route 8/11/27

State Route 8/11/27 is a minor arterial running southeast to northwest. State Route 8/11/27 is also known as Civic Center Drive from Townsend Road to Leighton Road and Belgrade Road from Leighton Road to the intersection with Old Belgrade Road. In the study area its cross-section is generally a two-lane roadway with auxiliary lanes at major intersections within approximately 100 feet of right-of-way. The posted speed limit is 35 mph from Townsend Road to Darin Drive, 45 mph from Darin Drive to Leighton Road, and 50 mph from Leighton Road to Old Belgrade Road. Land uses along Route 8/11/27 are primarily commercial and industrial including Augusta Marketplace, Augusta Civic Center, the University of Maine at Augusta, Irving Oil, and the Commerce Center.

Old Belgrade Road

Old Belgrade Road is a local two-lane roadway that parallels Route 8/11/27, within approximately 66 feet of right-of-way it connects State Route 104 (West River Road) with State Route 8/11/27. The posted speed limit is 45 mph. Land uses along Old Belgrade Road are mixed including the Harold Alfond Center for Cancer Care, Maine Veterans Memorial Cemetery, NRF Distributors, and residences. The MaineDOT Traffic Movement Permit for the last phase (Phase 3B) of the Augusta Marketplace requires the installation of a fully actuated traffic signal at the Old Belgrade Road and State Route 104 intersection, and the construction of an entrance from the Augusta Marketplace onto Old Belgrade Road.

Route 3 Connector

The State Route 3 Connector is an undivided National Highway System (NHS) principal arterial limited access highway linking I-95 and State Route 3 north of Augusta city center. The width of the highway is four-lanes west of Route 100/201(Riverside Drive) and two lanes between that point and Route 3/9/202 (North Belfast Avenue). The only access points are a partial interchange with I-95 at Exit 113 and Routes 104, 100/201, and 3/9/202.

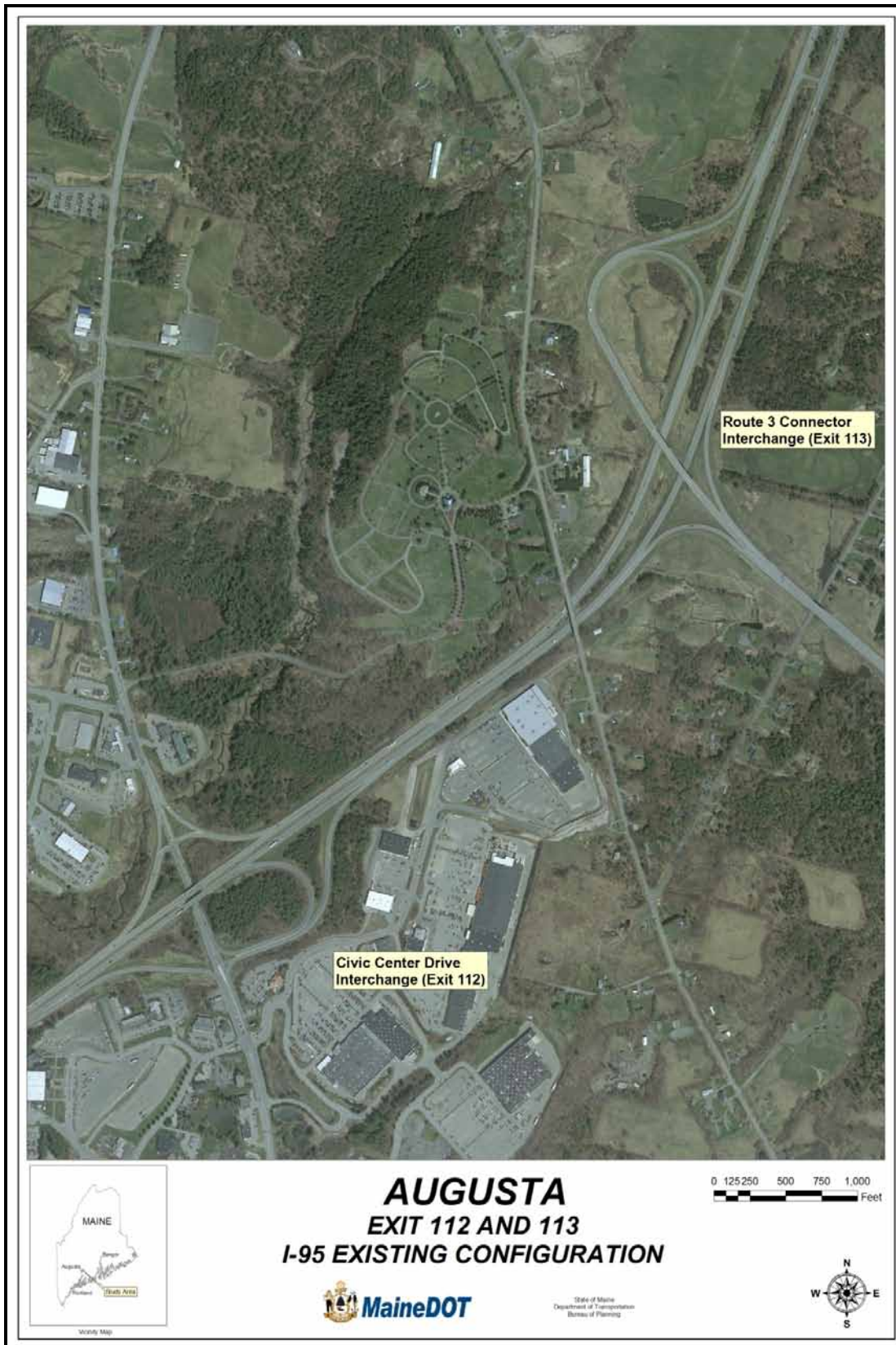


Figure 2. I-95 Existing Configuration

Townsend Road

Townsend Road is a two-lane major collector roadway that connects Civic Center Drive to State Route 104 (Northern Avenue) east of I-95. Land use along Townsend Road is principally residential.

Intersections

Traffic operations were analyzed at the following signalized and un-signalized intersections in the study area.

The Route 3 Connector Interchange (Exit 113)

The Route 3 Connector interchange is a trumpet configuration providing a connection between I-95 and State Route 3 to the east. The configuration does not provide access to northwest of the interchange. The Exit 113 interchange was primarily constructed to relieve congestion and remove heavy truck traffic from Exit 109 along Western Avenue and on the Memorial Bridge in Augusta. This is accomplished by allowing access to/from I-95 and the northeast portion of Augusta and points to the east on the other side of the Kennebec River. However, Exit 113 was not designed to relieve Exit 112 because it does not allow access directly to the immediate area west of I-95, forcing all such existing and future traffic through the already overburdened Exit 112 area. The interchange provides adequate acceleration and deceleration distances to merge or diverge from I-95 without introducing unsafe weaving movements.

Route 8/11/27 (Civic Center Drive) Interchange (Exit 112)

The Civic Center Drive interchange with I-95 is a diamond with loop interchange configuration.

Northbound (figure 3)

- The I-95 northbound ramps are split via two separate interchange exits, Exit 112A (city center bound traffic) and Exit 112B (Belgrade Lakes bound traffic).
- The Civic Center Drive southbound approach consists of an exclusive left-turn lane and two through lanes.
- The Civic Center Drive northbound approach consists of two through lanes and a channelized right-turn lane. These right turns are channelized through a raised delta island and have a free movement, with the Civic Center Drive southbound left-turns onto I-95 northbound ramp yielding to these vehicles.
- I-95 Exit 112A provides access to Civic Center Drive southbound and consists of a double right-turn lane under traffic signal control.
- I-95 Exit 112B provides access to Civic Center Drive northbound and consists of an exclusive right-turn lane under YIELD control.

Southbound (figure 4)

- Civic Center Drive and the I-95 southbound ramps intersect to form a four-way signalized intersection.
- The Civic Center Drive northbound approach consists of an exclusive left-turn lane and a through lane.
- The Civic Center Drive southbound approach consists of two through lanes and a channelized right-turn lane. These right turns are channelized through a raised delta island and yield to Civic Center Drive northbound left-turning vehicles.
- The I-95 southbound off-ramp consists of a double left-turn lane and an exclusive right-turn lane under YIELD control.



Figure 3. Aerial of Civic Center Drive at I-95 Northbound Ramp, Exit 112



Figure 4. Aerial of Civic Center Drive at I-95 Southbound Ramp, Exit 112

Route 8/11/27 (Civic Center Drive) at Garden Court and Community Drive

Garden Court and Community Drive intersect Civic Center Drive to form a four-way, signalized intersection. The Civic Center Drive southbound approach provides a double left-turn lane, two through lanes, and an exclusive right-turn lane. The Civic Center Drive northbound approach consists of an exclusive left-turn lane, two through lanes, and an exclusive right-turn lane. The Garden Court westbound approach provides an exclusive left-turn lane, a shared left-turn/through lane, and an exclusive right-turn lane. The Community Drive eastbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. An aerial image of the intersection is shown in Figure 5.



Figure 5. Aerial of Civic Center Drive at Garden Court and Community Drive

Route 8/11/27 (Civic Center Drive) at Darin Drive

Civic Center Drive and Darin Drive intersect to form a three-way, T-type un-signalized intersection. The Darin Drive eastbound approach provides an exclusive left-turn lane and an exclusive right-turn lane under STOP-sign Control. The Civic Center Drive southbound approach consists of one single, general-purpose lane. Although the southbound approach is not formally striped to provide separation between through and right turning vehicles, the existing pavement width does allow for a through and right turn vehicle to pull up to the intersection simultaneously. The Civic Center Drive northbound approach consists of an exclusive right-turn lane and a through lane. An aerial image of the intersection is shown in Figure 6.



Figure 6. Aerial of Civic Center Drive at Darin Drive

Route 8/11/27 (Civic Center Drive) at Leighton Road

Civic Center Drive at Leighton Road intersect to form a three-way, signalized intersection. The Civic Center Drive northbound approach consists of an exclusive left-turn lane and a through lane. The Belgrade Road southbound approach consists of shared through/right-turn lane. Although the southbound approach is not formally striped to provide separation between through and right turning vehicles, the existing pavement width does allow for a through and right turn vehicle to pull up to the intersection simultaneously. The Leighton Road eastbound approach consists of an exclusive left-turn lane and an exclusive right-turn lane. An aerial image of the intersection is shown in Figure 7.



Figure 7. Aerial of Civic Center Drive at Leighton Road and Belgrade Road

Multimodal

The availability and use of other transportation options in the study area are described under the following headings: transit systems, pedestrian and bicycle facilities, and park and ride lots.

Transit Systems

The Kennebec Valley Community Action Program operates local bus service in Augusta and neighboring towns. The agency's fixed-route public transportation program is known as KV Transit. KV Transit offers limited midday bus service on three routes in the Augusta area. One route connects downtown Augusta with locations east and north of downtown, including Maine General, the Augusta Marketplace, the University of Maine at Augusta, and Department of Human Services offices on Anthony Drive. Tom Crikelair Associates performed a review of transit operations in the area. The report is included in the Appendix. The review included; Existing Public Transit Services, Planned Transit Improvements, Impact of Proposed Roadway Changes on Transit Operations, Impact of Planned Transit Improvements on Traffic Conditions.

Pedestrian Facilities

Sidewalks are provided for pedestrian use along some roadways within the study area, they generally are only on one side of the road. The following is a listing of the sidewalks throughout the study area:

- Community Drive West Side
- Townsend Road East Side
- Garden Court West Side
- Community Drive East Side

Pedestrian signals, phases and crosswalks are provided in the study area at the following locations:

- Westbound Civic Center Drive approach at Townsend Road and Community Drive
- Westbound Civic Center Drive approach at Garden Court and Community Drive
- Garden Court southbound approach at Civic Center Drive, Garden Court and Community Drive

Bicycle Facilities

At present, there are no designated bicycle facilities within the study area.

Park and Ride Lots

There is one park and ride lot within the study area located at the Augusta Civic Center North Lot adjacent to the Holiday Inn parking lot. The lot provides 24 parking spaces. Usage of the lot was surveyed by MaineDOT personal in 2006 and found to be approximately 15% of available capacity.

B. Crash History and Analysis

The latest three years of available crash data (2005 through 2007) were used to identify High Crash Locations (HCL's) in the study area. MaineDOT uses two criteria to evaluate and define a High Crash Location for a transportation facility. Both criteria must be met in order to be classified a HCL. These criteria are:

1. *A Critical Rate Factor (CRF) of 1.00 or more for a three-year period. A highway location with a CRF greater than 1.00 has a frequency of crashes that is significantly greater than the statewide average for similar locations; and*
2. *A minimum of eight crashes over a three-year period.*

A summary of the MaineDOT crash data is provided in Table 1 for the study area intersections and in Table 2 for the study area roadway segments.

Table 1. Crash Data Summary 2005-2007: Intersections

Node	Intersection	Number of Collisions	CRF	HCL
27999	Civic Center Dr at Townsend Rd and Community Dr	20	< 1.0	No
26406	Civic Center Dr at Garden Court and Community Dr	20	< 1.0	No
28791	Civic Center Dr at I-95 NB on-ramp	11	1.41	Yes
28792	Civic Center Dr at I-95 NB off-ramp	27	4.28	Yes
28846	Civic Center Dr at I-95 SB on / off-ramp	13	< 1.0	No
26399	Civic Center Dr at Darin Dr	7	< 1.0	No
28000	Civic Center Dr at Leighton Rd	4	< 1.0	No
28651	Belgrade Rd at Gabriel Dr	0	0	No
28001	Belgrade Rd at Bog Rd	0	0	No
28002	Belgrade Rd at Old Belgrade Rd	1	< 1.0	No
26357	Old Belgrade Rd at Route 104 (West River Rd)	4	1.02	No
25585	Old Belgrade Rd at Eight Rod Rd	5	2.25	No
25587	Old Belgrade Rd at Middle Rd	2	< 1.0	No
25588	Old Belgrade Rd at Bog Rd	9	2.85	Yes
28845	Exit 112 I-95 SB on-ramp from Civic Center Drive	6	1.03	No
28794	Exit 112B I-95 NB on-ramp	1	< 1.0	No
29008	Exit 113 SB off-ramp to Route 3 and on-ramp from Route 3	1	1.41	No
29010	Exit 113 Route 3 overpass bridge	1	< 1.0	No
29013	Exit 113 NB off-ramp to Route 3 and on-ramp from Route 3	3	1.64	No
29012	Exit 113 I-95 NB off-ramp to Route 3	1	< 1.0	No
29011	Exit 113 I-95 NB on-ramp from Route 3	1	< 1.0	No

Table 2. Crash Data Summary 2005-2007: Road Segments

Nodes	Street	From	To	Number of Collisions	CRF	HCL
26406-27999	Civic Center Dr	Garden Court	Townsend Rd	11	< 1.0	No
26406-28791	Civic Center Dr	Garden Court	I-95 NB on-ramp	2	< 1.0	No
28791-63298	Civic Center Dr	I-95 NB on-ramp	I-95 NB on-ramp	3	< 1.0	No
63298-28792	Civic Center Dr	I-95 NB on-ramp	I-95 NB off-ramp	0	0	No
28195-28792	Civic Center Dr	I-95 Bridge	I-95 NB off-ramp	1	< 1.0	No
28195-63290	Civic Center Dr	I-95 Bridge	I-95 SB off-ramp	1	< 1.0	No
63290-28846	Civic Center Dr	I-95 SB off-ramp	I-95 SB on / off-ramp	0	0	No
26399-28846	Civic Center Dr	Darin Dr	I-95 SB Ramps	9	1.24	Yes
26399-28000	Civic Center Dr	Darin Dr	Leighton Rd	11	< 1.0	No
28000-28651	Belgrade Rd	Leighton Rd	Gabriel Dr	14	< 1.0	No
28001-28651	Belgrade Rd	Bog Rd	Gabriel Dr	1	< 1.0	No
28001-61715	Belgrade Rd	Bog Rd	Wilson St	2	< 1.0	No
61715-28002	Belgrade Rd	Wilson St	Old Belgrade Rd	0	0	No
25583-26357	Old Belgrade Rd	0.25 n/o West River Rd	West River Rd	0	0	No
25583-25584	Old Belgrade Rd	0.25 n/o West River Rd	Ballard Rd	2	< 1.0	No
25584-25585	Old Belgrade Rd	Ballard Rd	Eight Rod Rd	0	0	No
25585-25586	Old Belgrade Rd	I-95 Underpass	Eight Rod Rd	3	< 1.0	No
25586-25587	Old Belgrade Rd	I-95 Underpass	Middle Rd	5	< 1.0	No
25587-25588	Old Belgrade Rd	Middle Rd	Bog Rd	0	0	No
25588-28002	Old Belgrade Rd	Bog Rd	Belgrade Rd	0	0	No
26709-27999	Townsend Rd	Non-Inter.	Civic Center Dr	9	< 1.0	No
28847-28848	I-95	I-95 SB under Old Belgrade Rd Bridge	Exit 112 I-95 SB off-ramp	7	< 1.0	No
28845-28847	I-95	Exit 112 I-95 SB off-ramp	Exit 112 I-95 SB on-ramp	3	< 1.0	No
28848-29009	I-95	Exit 113 I-95 SB on-ramp	I-95 SB under Old Belgrade Rd Bridge	3	< 1.0	No
28793-28933	I-95	I-95 NB overpass	I-95 NB Exit 112B off-ramp	3	< 1.0	No
28793-28794	I-95	Exit 112B I-95 NB off-ramp	Exit 112B I-95 NB on-ramp	1	< 1.0	No
28794-28795	I-95	Exit 112B I-95 NB on-ramp	I-95 NB under Old Belgrade Rd Bridge	5	< 1.0	No
28795-29012	I-96	I-95 NB under Old Belgrade Rd Bridge	Exit 113 I-95 NB off-ramp	1	< 1.0	No
29011-29012	I-95	Exit 113 I-95 NB off-ramp	Exit 113 I-95 NB on-ramp	4	< 1.0	No
28796-29011	I-95	Exit 113 I-95 NB on-ramp	Non-Int I-95 NB	3	< 1.0	No
28211-63300	Exit 112A NB Ramp	Exit 112A NB off-ramp	Civic Center Drive	1	< 1.0	No

28792-28793	Exit 112B NB Ramp	Exit 112B NB off-ramp	Civic Center Drive	1	< 1.0	No
28791-63297	Exit 112B NB Ramp	Civic Center Drive	Ramp on from Civic Center Drive	1	< 1.0	No
28845-63291	Exit 112 SB Ramp	Ramp on from Civic Center Drive	I-95 SB on-ramp	2	< 1.0	No
28849-29008	Exit 113 SB Ramp	I-95 SB off-ramp	Route 3	3	2.17	No
29012-29013	Exit 113 NB Ramp	I-95 NB off-ramp	Route 3	6	1.79	No

As shown in Table 1, there are three intersections within the study area that are considered HCLs, including: the Civic Center Drive intersection with the I-95 northbound off-ramp to Civic Center Drive northbound, and the I-95 northbound on-ramps and the off-ramp to Civic Center Drive southbound; and the Old Belgrade Road at Bog Road intersection. In addition, there is one study area roadway segment that is considered an HCL as shown in Table 2; Civic Center Drive from the I-95 southbound ramps to Darin Drive. Figure 8 depicts the HCL's within the Study Area. Collision diagrams were prepared for these locations to determine if there are any crash patterns or trends evident that may indicate correctable roadway/intersection deficiencies. These diagrams are provided in Appendix C. The following is a description of the incidents occurring at the four high crash locations.



Figure 8. High Crash Locations within Study Area

Civic Center Drive at I-95 NB On-Ramps and Off-Ramp to Civic Center Drive SB (Node 28791)

There were five crashes reported in 2005, two in 2006 and three in 2007. The crash pattern is left turning vehicles on Civic Center Drive turning onto the I-95 northbound on-ramp being hit by through vehicles from the opposite direction on Civic Center Drive. These crashes are attributable to either failure to yield or driver inattention during times of heavy congestion. A 150 foot left turn lane was added to Civic Center Drive for vehicles turning onto I-95 northbound in September of 2005 as mitigation under Augusta Market Place Phase 3 Traffic Movement Permit; however, the location is still considered an HCL.

Table 3. Crash Summary for Civic Center Drive at I-95 Northbound On-Ramps and Off-Ramp to Civic Center Drive Southbound (11 Crashes from 2005 to 2007)

Location/Direction	Type	Number	Number of Injuries
I-95 Exit 112 NB On-ramp from Civic Center Drive	Rear End Collision	1	Property Damage
Eastbound turning movement from Civic Center Drive onto I-95 NB On-ramp	Angle Collision	6	(1) Non-Incapacitating (3) Possible Injury
Eastbound on Civic Center Drive at intersection with I-95	Rear End Collision	1	(1) Possible Injury
Westbound on Civic Center Drive at intersection with I-95	Rear End Collision	1	Property Damage
Intersection of I-95 NB Off-ramp to East Bound Civic Center Drive	Angle Collision	1	Property Damage
Intersection of I-95 NB Off-ramp to East Bound Civic Center Drive	Rear End Collision	1	Possible Injury

Civic Center Drive at the I-95 Northbound Off-Ramp to Civic Center Drive Northbound (Node 28792)

There were eight crashes reported in 2005, ten in 2006 and nine in 2007. There is a pattern of rear-end collisions on the I-95 northbound right turn slip ramp, typical of this configuration, which occur as motorists are looking behind them to find a gap, instead of ahead. The majority of these crashes are attributable to either failure to yield or driver inattention during times of heavy congestion.

Table 4. Crash Summary for Civic Center Drive at the I-95 Northbound Off-Ramp to Civic Center Drive Northbound (27 Crashes from 2005 to 2007)

Location/Direction	Type	Number	Number of Injuries
Northbound Off-ramp to Civic Center Drive	Rear End Collision	22	(1) Incapacitating Injury (1) Non-Incapacitating (5) Possible Injury
Westbound on Civic Center Drive at intersection with I-95 NB Off-ramp	Rear End Collision	3	(2) Possible Injury
Westbound on Civic Center Drive at intersection with I-95 NB Off-ramp	Angle Collision	2	(1) Possible Injury

Civic Center Drive from Darin Drive to I-95 Southbound Ramps (Link 26399 – 28846)

There were three crashes reported in 2005, three in 2006 and three in 2007. There is no pattern evident from the diagram but the majority of crashes within this section of roadway are due to poor traffic operations resulting from heavy traffic congestion of the merging/turning vehicle movements into adjacent businesses.

Table 5. Crash Summary for Civic Center Drive from Darin Drive to I-95 Southbound Ramps (9 Crashes from 2005 to 2007)

Location/Direction	Type	Number	Number of Injuries
Westbound on Civic Center Drive at Comfort Inn Driveway	Angle Collision	2	(2) Property Damage
Westbound on Civic Center Drive	Rear End Collision	2	(1) Potential Injury
Westbound on Civic Center Drive w/left turn movement	Sideswipe Collision	1	Potential Injury
Eastbound on Civic Drive	Angle Collision	3	(1) Non-Incapacitating
Eastbound on Civic Drive	Sideswipe Collision	1	Property Damage

Old Belgrade Road at Bog Road (Node 25588)

There were actually only eight (8) crashes reported at this intersection as one had been miscoded. Five occurred in 2005 and three occurred in 2006. The majority of crashes occurred when an Old Belgrade Road vehicle disregarded the stop sign. Since these crashes occurred, all-way stop control was implemented at the intersection as mitigation under MaineGeneral Cancer Center's Traffic Movement Permit. None of the crashes occurred after all-way stop was implemented so it appears that the crash problem has been corrected by this action. MaineDOT will continue to monitor this location.

Table 6. Crash Summary for Old Belgrade Road at Bog Road (9 Crashes from 2005 to 2007)

Location/Direction	Type	Number	Number of Injuries
Northbound on Bog Rd at Intersection with Old Belgrade Road	Angle Collision	5	(1) Incapacitating Injury (1) Non-Incapacitating (6) Possible Injury
Southbound on Bog Rd. at Intersection with Old Belgrade	Angle Collision	3	(5) Non-Incapacitating (1) Possible Injury

C. Geometric Deficiencies at Exit 112 and Exit 113

I-95 within the study area was constructed 45 years ago; therefore, elements of its design do not meet current design requirements as contained in *A Policy on Geometric Design of Highway and Streets*, 2004, by the American Association of State Highway and Transportation Officials (AASHTO) or the Maine Department of Transportation's *Highway Design Guide*. Obsolete design features based on current criteria are inadequate merge and diverge distances provided at the Exit 112 ramp junctions with the exception of the I-95 northbound on-ramp which was reconfigured and extended as an auxiliary lane as part of the Exit 113 construction. Updating the Exit 112 ramps to current design standards was not reviewed as it is outside the scope of this study.

The Exit 113 ramps currently meet today's design standards and any future construction changes to Exit 113 would not reduce the effectiveness of the interchange to satisfy the design standards.

D. 2008 Existing Traffic Volumes

To identify the existing traffic volumes in the study area, turning movement counts were collected at representative intersections in a collaborative effort between MaineDOT and Gorrill-Palmer Consulting Engineers Inc. in 2007-2008 for the weekday AM, Midday, and PM peak hours. Appendix A Figures 2, 3, and 4 identify the locations, dates, peak hours and associated raw peak hour traffic volumes as a result of the turning movement count effort.

Based on those counts, the weekday Midday peak hour (12:00 PM to 1:00 PM) and PM peak hour (4:30 PM to 5:30 PM) were identified as the overall busiest time periods, most likely due to the level of commercial and retail development in the area that does not generate a large amount of peak AM traffic. Therefore, those time periods were chosen as the time periods upon which to base the future analysis and associated recommendations. The 2008 Midday and PM peak hours were seasonally adjusted to reflect the peak summer time conditions. If the counts were from 2007, they were both annually adjusted to 2008 as well as seasonally adjusted to reflect the peak summer time conditions. The intersection volumes were also balanced between nearby groups of intersections; however, intersections that have numerous driveways in between were not balanced, as would be expected in the field. All counts were factored to represent 2008 conditions. The resulting volumes are shown in Appendix B Figures 5 and 6.

E. Existing Zoning and Land Use

Zoning

Current zoning for the study area is split between six different districts, with five being primarily non-residential in nature. Augusta's 2007 Comprehensive Plan, found consistent with the State's Growth Management Act by the Maine State Planning Office, identifies the study area as part of the larger "economic growth" area of the city, following the development trends that started thirty years ago.

The southern end of the study area, along Townsend Road, Northern Ave, and much of Old Belgrade Road east of I-95, is zoned for residential use at a density that allows one dwelling unit per 5,000 square feet of land. The remaining southern area, east of I-95 and along Civic Center Drive, is zoned for large commercial and other non-residential activities similar to the existing uses which include the Augusta Civic Center, the University of Maine at Augusta, and the Augusta Marketplace which is a "retail power center".

The northern end of the study area is dominated by three non-residential zones. Two areas are zoned for industrial use and include Augusta's three primary business parks, one having substantial room for additional growth available. A large area along Civic Center Drive is zoned for mixed uses, which has trended toward retail and office uses, with substantial land available for growth. And the third large zone is the Medical district along the east side of Old Belgrade Road focused primarily on uses related to the existing Harold Alfond Center for Cancer Care and other possible medical facilities. The area immediately to the west of Old Belgrade Road is currently zoned for mixed uses similar to the zoning along Civic Center Drive, but Augusta's 2007 Comprehensive Plan recommends a re-assessment of this area to possibly refocus it on medical uses.

The final zoning district in the study area is at the extreme northern end and of a less intense mixed use nature. Directly on Civic Center Drive the uses are expected to be non-residential, but for the Bog Road intersection, they may remain residential.

Existing Land Use¹

Existing land uses in the area mirror the existing zoning of the area. The southern and southeastern sections of the study area are relatively dense single-family detached residential structures, with some additional room for new units. Since 1990 there have been ten new dwelling units constructed within the study area, another 15 new dwelling units are anticipated in the near future and the possibility of 50 to 100 more in the coming 20 years. The area is very close to local services, is served by public water and sewer, and provides a relatively quiet setting.

The central portion of the study area is bisected by I-95. Near Exit 112, the dominant land uses are non-residential, including the Augusta Civic Center, the University of Maine at Augusta, the Augusta Business Park, and the Market Place at Augusta. This area is a primary driver of economic, cultural, and educational activities in Augusta and is anticipated to continue to serve the same functions. The University has expressed an ongoing interest in expansion, with the possibility of residential facilities being added in coming decades. The campus is currently a commuter-only facility.

The extreme southern section of the study area, following Townsend Road, Northern Avenue, and the southern section of Old Belgrade Road is primarily residential. New commercial development in this sector since 1990 includes:

The Market Place at Augusta is a retail power center that started development in 1990 with the construction of Wal-Mart and now includes nearly 675,000 square feet of retail space, with one remaining development phase available. The remaining phase of 335,000 square feet would include a traffic access location onto Old Belgrade Road.

Across Civic Center Drive, in front of the Augusta Civic Center, development has occurred slowly but continuously since the Civic Center construction in 1975. Since 1990, the following construction has occurred: Gardiner Savings bank (6,000 square feet); Capital Gate LLC consisting of condo medical offices (11,590 square feet); Anatinae LLC consisting of offices (5,700 square feet); the Maine School Board Association (15,700 square feet); University of Maine at Augusta (Student Center, 23,600 square feet; Classroom Addition, 20,300 square feet; Library Addition, 6,000 square feet).

The area from the Augusta Business Park to the Leighton Road intersection with Civic Center Drive has been the focus of industrial and office space development since the early 1980s, with retail, hotel, and other uses slowly starting to fill in some of the remaining parcels. Nearly all residential units remaining in this area are for sale. Since 1990, the following construction has occurred: J & R Associates, LLC constructed three buildings (Wendy's - 3,300 square feet, Maine DMV, 7,500 square feet, Office and fitness club, 34,000 square feet); Irving Oil large gas station and convenience store (4,200 square feet); Fairfield Inn with 98 units (45,500 square feet); Brake Service and Parts, Inc repair (6,500 square feet); JS McCarthy Printers (36,000 square foot addition); Taco Bell/KFC (2,900 square feet); Advance Auto (6,800 square feet); Harper's North, LLC (Office, 25,000 square feet); Snow Cone Properties (Dentist's Office, 5,800 square feet); Concord Coach (Regional Bus terminal, 3,800 square feet); D & L Cyr Investments (Furniture Retail, 21,500 square feet);

The northern portion of the study area presents two very distinct land use types, one along Civic Center Drive and the other along Old Belgrade Road. Both areas are changing rapidly as this is the area with the greatest amount of available land. Industrial developments have been located in the area since the early 1980's when Digital Equipment constructed a very large manufacturing facility on Civic Center Drive.

SES Augusta, LLC (Tractor Supply retail, 16,100 square feet); Civic Center Acquisitions, LLC (Office building rented by the state, 13,300 square feet); Central Maine Commerce Center (Office, 19,000 square feet); Central Maine Commerce Center (Dentist Office, 4,400 square feet); Maine Forest Products Council (Office, 5,000 square feet); Maine Farm Bureau (Office, 6,800 square feet); JMK Properties (Manufacturing, 10,900 square feet); Bolduc Technology Group (Manufacturing, 16,200 square feet under construction); Mechanical Services (Service, 4,000 square feet); Roger Pomerleau Trustee (NRF Warehouse, 104,000 square feet); Family Planning Association of Maine (Service, 8,000 square feet); Transco (Wholesale office furniture, 10,900 square feet); U.A. Local 716 (Union Hall, 15,800 square feet); Brian Beland (SF Residence, 3,400 square feet); Carol Lane (SF Residence, 1,350 square feet); William Burney (SF Residence, 2,600 square feet); James Albert (SF Residence, 2,900 square feet); Roger Morin (SF Residence, 1,050 square feet); Maine General Medical Center (Cancer Center, 59,900 square feet); Brenda Philbrook (SF Residence, 2,800 square feet); Maine Greyhound Placement (Vet Clinic, 2,000 square feet).

What follows is Figure 9, which illustrates current land use districts in Augusta. The commercial zoning districts in Augusta as provided in the 2007 Augusta Comprehensive Plan are depicted in Figure 10.

¹ Source: Matthew Nazar, Deputy Director of Development Services, City of Augusta, Maine, December 15, 2009, letter to Judith Lindsey, MaineDOT

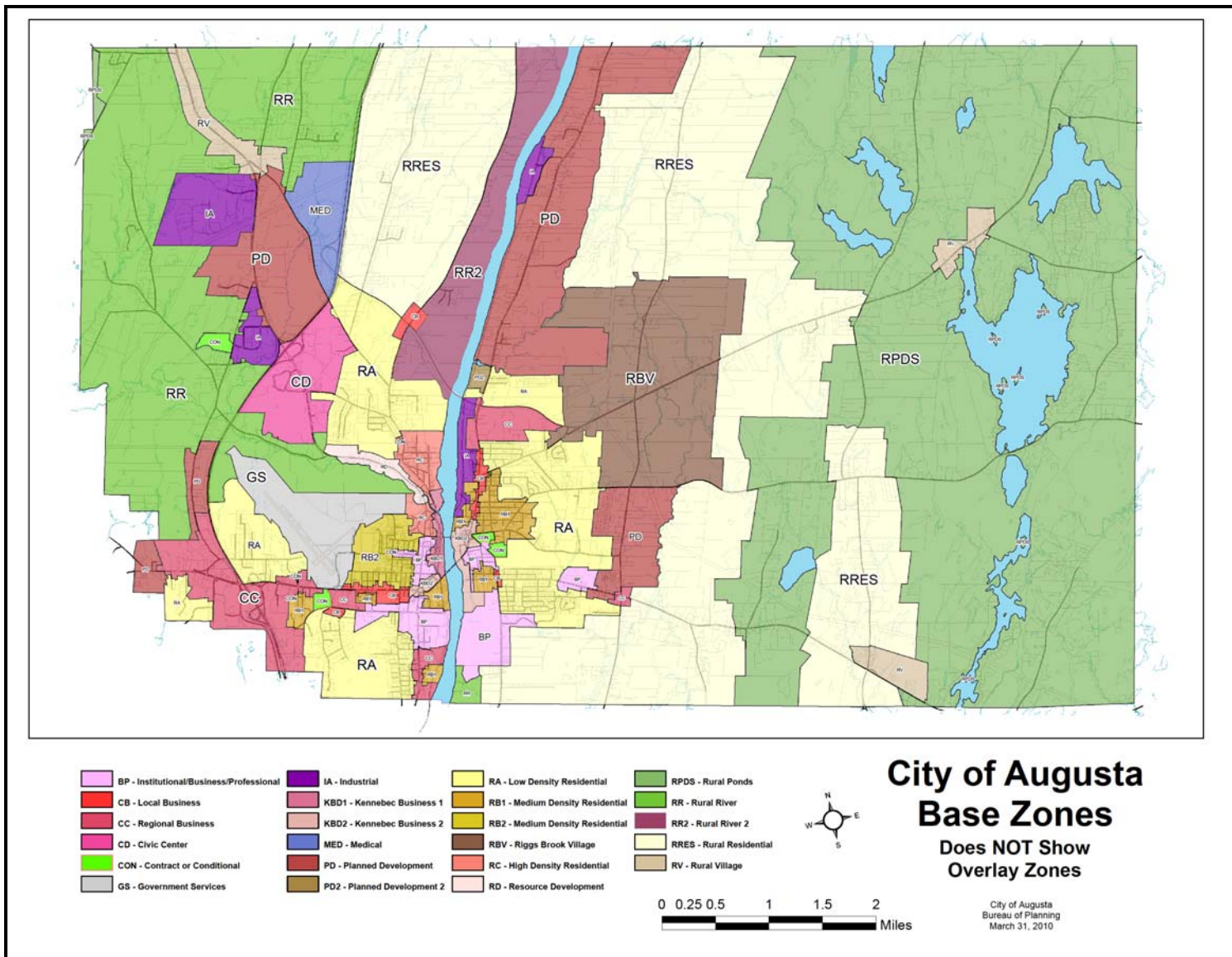


Figure 10, Commercial Zoning Districts in Augusta

F. Preliminary Environmental Constraints

While detailed environmental studies were not conducted for this phase of the study, preliminary investigations were done to identify site-specific environmentally sensitive areas for wetlands, hazardous waste sites, floodplains, aquifers, Section 4(f), Section 6(f), conservation properties, historic and archaeological resources, and ecological considerations. An Environmental Assessment (EA) will be required in subsequent development phases pursuant to FHWA and the National Environmental Policy Act (NEPA) requirements. The checklist EA will specifically address the impact of the proposed improvement and include further coordination with resource agencies as well as public involvement.

The following are anticipated resources and potential areas of concern within the study area:

- Wetlands;
- Water quality of Stone Brook which drains to Bond Brook;
- Public water wells;
- Federal Emergency Management Agency (FEMA) 100-year floodplain, Zone A;
- Atlantic salmon;
- Uncontrolled Petroleum and Hazardous Waste;
- Vernal pools;
- Archaeological Resources; and
- Wildlife.

Land use is described in Sections II. E. and III. A.

A constraints map is shown in Appendix G depicting readily available information from geographic information system (GIS) at the time of this report and should not be considered all inclusive as field verification will be conducted during preparation of the EA.

III. Future Conditions

A. Future Land Use and Zoning

Future land use around Exits 112 and 113 is discussed in detail in the 2007 Augusta Comprehensive Plan, adopted by the Augusta City Council in January of 2008. The Exit 112 interchange has existing traffic issues and new development in the direct vicinity of the exit is not anticipated. But new development just beyond the existing development, potentially replacing the few remaining residential units north of Exit 112 on Civic Center Drive, is likely and desirable for the City. The area around Exit 112 has been the focus for commercial and industrial growth for the last 35 years, and the expectation is that this trend will continue. Water and sewer to service the anticipated development is in the process of being upgraded to eliminate any potential limitations on development of this area due to inadequate services. Managing the traffic in this area that results from the existing and anticipated development is an important part of the city plans. Augusta's growth area is depicted in the following graphic, Figure 11.

The area around Exit 113 is expected to undergo a carefully managed expansion of development over the coming decade, including the construction of a new regional hospital, associated medical offices, and some limited services for visitors to these facilities. The regional hospital will consolidate inpatient operations of three hospital campuses in Augusta and Waterville. The new medical facility is a critical component of the City's plan for attracting high quality jobs and ancillary businesses, and providing an essential service to residents of the city and the region. The location of these facilities at an easily accessible site from any location in the region is necessary to the provision of expansion such services. Augusta is interested in ensuring the quality of this development and its impact on public facilities, including transportation facilities, is carefully considered during the planning stages. Future land use in Augusta is depicted on Figures 12 and 13.

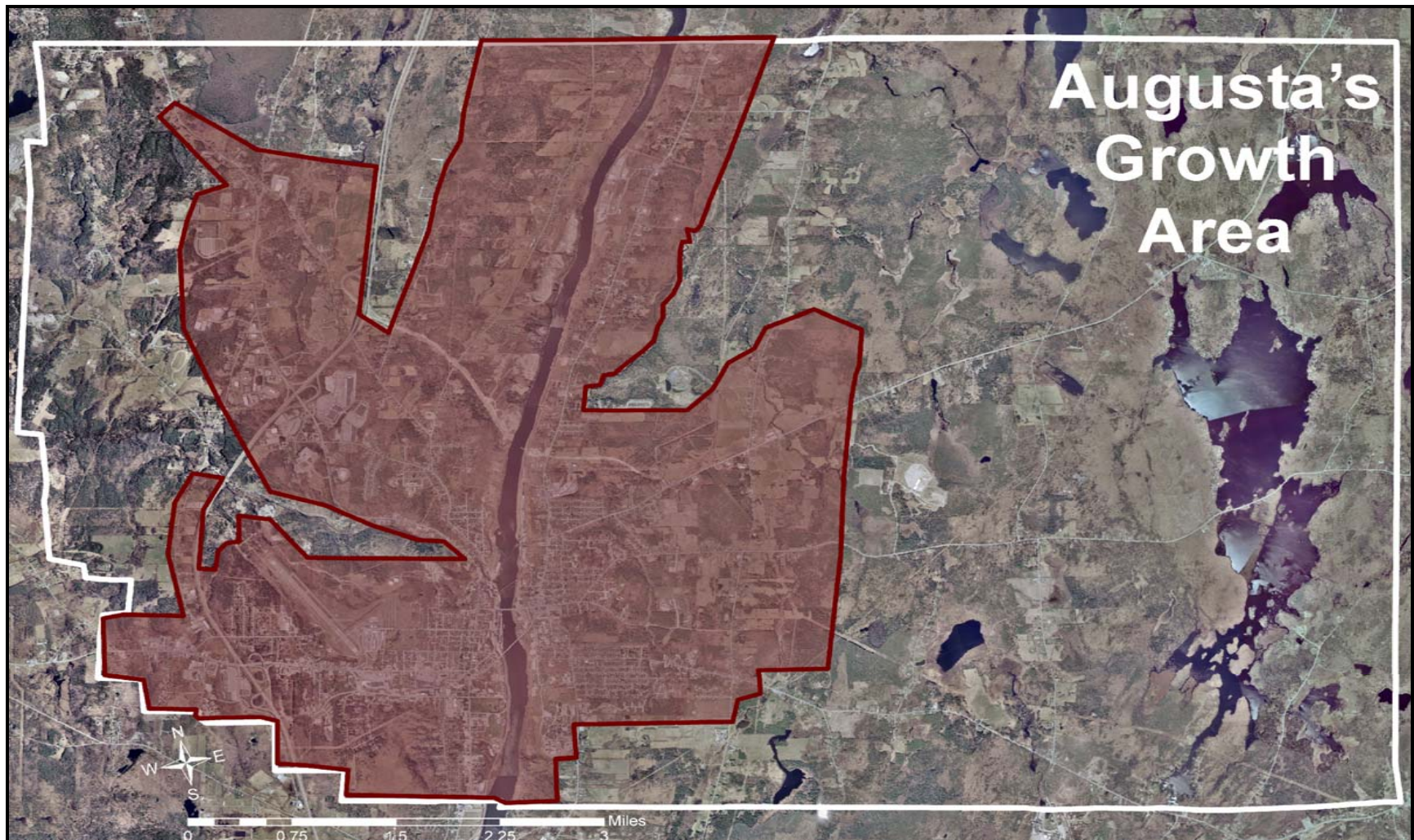


Figure 11, Growth Area

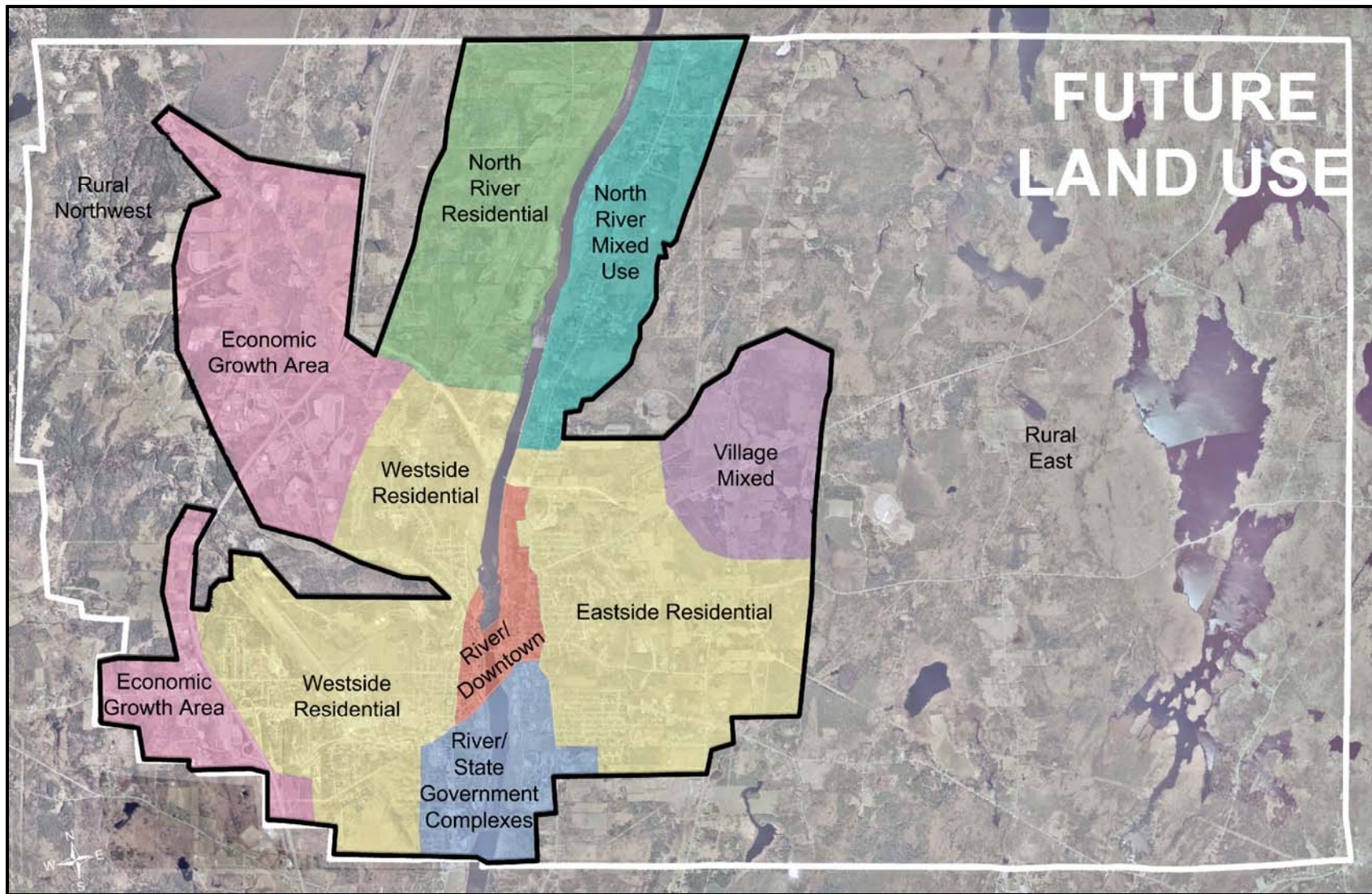


Figure 12, Future Land Use

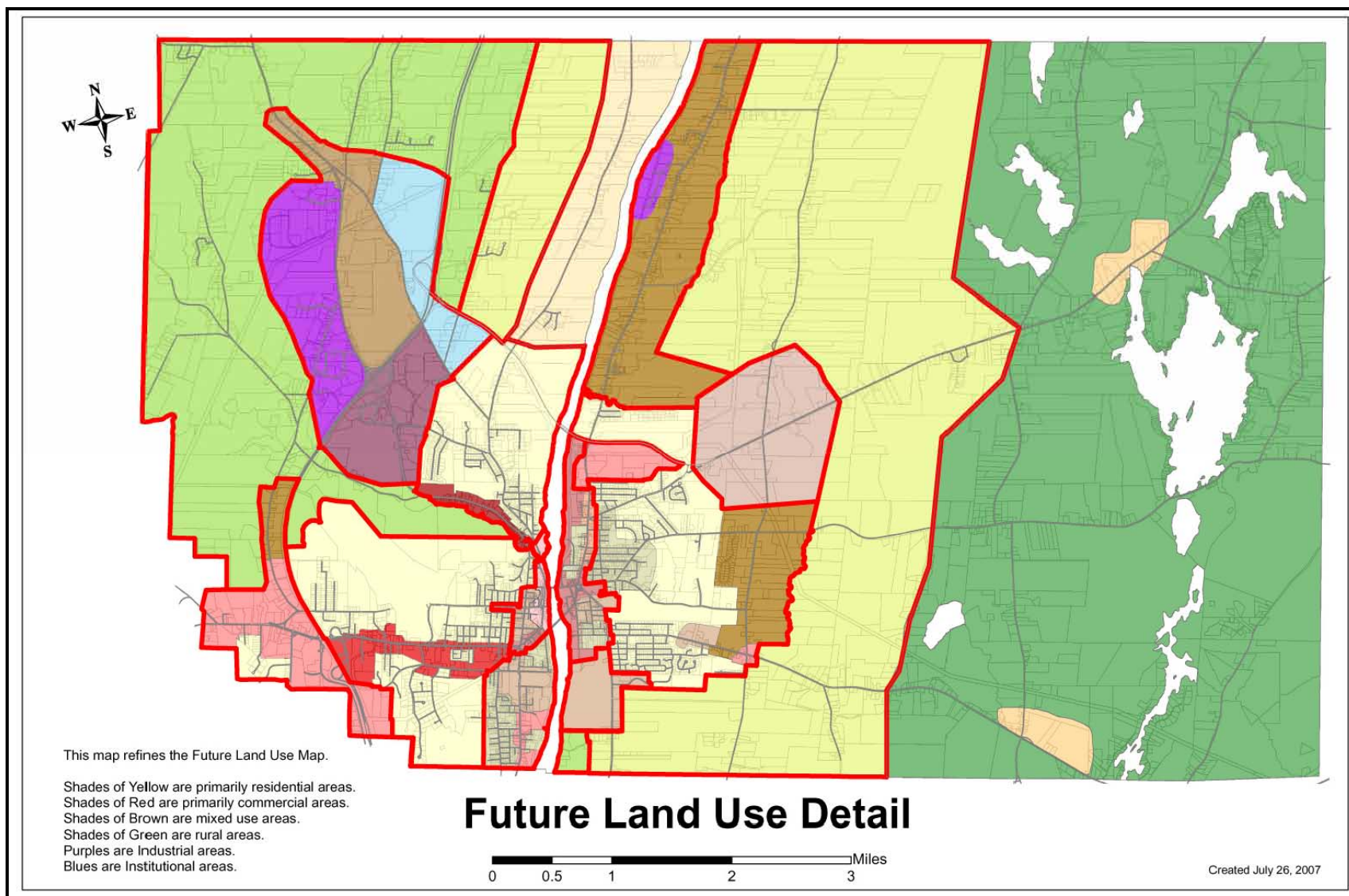


Figure 13, Future Land Use Detail

B. 2028 Traffic Volumes

This study used two components to develop the 2028 future peak hour traffic volumes; growth from development within the study area, and background growth from outside the study area.

Projected Development

Over 2.48 million square feet of potential development within the next ten years has been identified in the study area based on the Augusta Comprehensive Plan and discussions with the City of Augusta. This square foot total does not include the facilities that may be required to accommodate the University of Maine at Augusta's plan to double its enrollment in the next twenty years. Table 7 shows the assumptions about future development in the study area that were incorporated in this study to project future traffic volumes. These developments, as depicted in Table 7, are in various stages including conceptual, planning, permitting and operational. Trip generation for the projected development was based either on information provided by MaineDOT / City of Augusta or the Institute of Transportation Engineers (ITE) publication *Trip Generation*, 7th Edition. The developments are dispersed throughout the area, so the relative impacts to the adjacent roadway system should be similar regardless of the exact location of the development. Figure 14 depicts the approved and potential development locations within the study area. The supporting calculations are provided in Appendix D.

Table 7. Approved and Potential Development within the Study Area

Development Location	Development Description	Total Development (square feet)	Midday Trip Generation	PM Trip Generation
1	Warehouse	105,000	299	251
	Office	105,000		
2	Business park	425,000	680	571
3	Bank with 2 drive thru lanes	3,000	185	120
4	Fast food	9,000	768	549
	Specialty retail	90,000		
5	Specialty retail	20,000	369	311
	Office	100,000		
	Warehouse	100,000		
6	Concord Coach Bus Station (opened in 2008)	--	62	62
7	Self-storage	100,000	30	25
8	Bank with 3 drive thru lanes	3,000	230	145
9	Meeting space	8,000	21	107
10	University of Maine	Increase by 2000 students	428	400
11	Residential	48 units	23	35
12	Residential	12 units	5	7
13	Residential	57 units	27	45
14	Shopping center	280,000	950	812
15	Hospital	350,000	574	482
16	Medical office	200,000	714	600
17	Specialty retail	150,000	742	630
	Office	150,000		
18	Office	145,000	393	330
	Warehouse	145,000		
Total		2,488,000	6500	5482
		117 units		

Of the eighteen locations, there are five locations totaling 705,000 square feet of the 2.49 million square feet of development that has been permitted by either MaineDOT or the City of Augusta. This square foot total does not include the Concord Coach Bus station recently in operation. These are shown in bold above as locations 2, 6, 11, 12, and 14. This permitted development is expected to generate an additional 1720 Midday peak hour trips and 1480 PM peak hour trips. The total generated trips anticipated for the total proposed development is approximately 6500 Midday peak hour trips and 5482 PM peak hour trips.

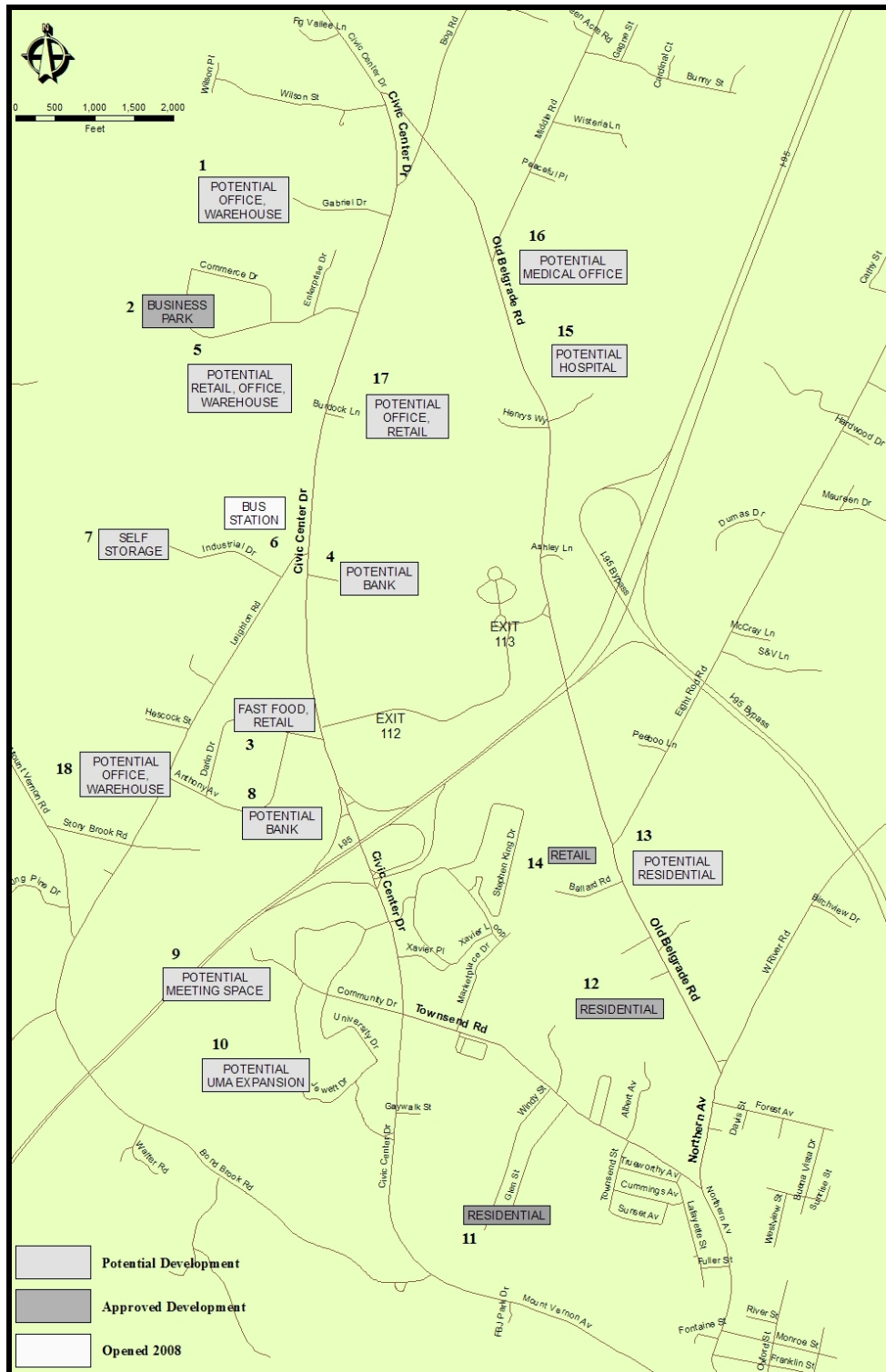


Figure 14. Approved and Potential Development within the Study Area

Background Growth

To account for the background growth outside the study area, the base volumes counted were increased by a growth factor rate of 0.5 % per year from 2008 to 2028. This growth factor was determined after a

review of the historical background growth in the area and consultation with both the City of Augusta staff and MaineDOT. The resulting 2028 volumes are shown in Appendix B Figures 7 and 8.

The 2028 future traffic volumes were added to the potential development volumes to yield 2028 traffic volumes for the weekday Midday peak hour and PM peak hour. These volumes are shown in Appendix B Figures 11 and 12.

Reassignment of Traffic

It would be expected, with the reconstruction of Exit 113 to a full movement interchange accessing onto Old Belgrade Road and Route 8/11/27, existing traffic patterns and traffic volumes would change. Both existing traffic and other potential development traffic was reassigned from the existing roadway network patterns to reflect one with the full Exit 113 interchange alternatives in place. This reassignment is based on a review of existing traffic patterns and input from City Staff and MaineDOT. The redistribution primarily revolves around the driver from each location taking what appeared to be the easiest and most direct route to get to their anticipated destination. Although there is no exact way to identify the potential redistribution, the resulting reassignment is expected to yield realistic results for the purposes of this report. Any minor differences between the assumed distribution and the actual distribution would not be expected to change the conclusions of this report. Those reassigned volumes are shown in Appendix B Figures 13, 14, 17, and 18.

IV. Conceptual Alternatives

The following conceptual alternatives were developed with input from MaineDOT, FHWA, Maine Division, and the City of Augusta and evaluated against the purpose and need formulated as part of this study. Four general strategies were identified:

- No-Build Alternative;
- Transportation Systems Management (TSM);
- Transportation Demand Management (TDM); and
- 2028 Reasonable Range of Build Alternatives.

A. No Build Alternative

The No-Build Alternative assumes that no further construction or major reconstruction would occur except for projects that are already planned and programmed, and the present level of maintenance would continue within the time period of the study. Maintenance activities could include resurfacing, traffic lane markings, and signing, spot shoulder and drainage improvements. Within the study area, there are two planned projects on the existing roadway system. One project, Project Identification Number (PIN) 015088.00, will replace the bridge deck on the I-95 northbound bridge over Civic Center Drive. This project is currently being designed with construction planned for spring 2010. The other project, PIN 016790.00, is a mill and fill pavement treatment with guardrail and drainage updates on I-95 southbound from the Dinsmore overpass in Sidney extending southerly to the Maine Turnpike. This project is in the planning stage with construction sometime in 2011. The No-Build is the base condition to which all other alternatives are compared.

B. Transportation Systems Management (TSM)

Transportation Systems Management (TSM) actions generally represent relatively low cost measures to improve traffic operations and/or enhance safety. These measures typically include traffic signal timing or phasing adjustments, designation or exclusive turning lanes within the existing pavement area, channelization of traffic flows, driveway consolidation or controls, and adding or improving traffic signing and pavement markings to promote better directional guidance. The following TSM concepts have been implemented from years 1993 to 2008:

Old Belgrade Road and Bog Road

- Converted the intersection to a 4-way stop controlled intersection and installed a flashing 4-way LED red beacon with dual alternating flashers on each approach

Civic Center Drive at Leighton Road

- Installation of a fully actuated traffic control signal
- Restriped Leighton Road approach to an exclusive left-turn lane and an exclusive right-turn lane with adequate storage lengths and turning radii
- Modified Civic Center Drive northbound approach to include a fully shadowed left-turn lane with 175 feet of storage plus deceleration and tapers
- Installation of overhead lane designation signs

Civic Center Drive at Darin Drive

- Restriped Darin Drive approach to provide for 275 feet of dual exit lanes from Civic Center Drive, with appropriate left and right-turn arrow pavement markings

Civic Center Drive at I-95 Southbound Ramps

- Widened Civic Center Drive to four lanes west of I-95, providing two through eastbound lanes, one westbound left-turn lane, and one westbound through lane
- Relocated and signalized the left-turn ramp from I-95 southbound
- Installation of painted dashed lane lines, as well as in pavement lane lighting for the double left-turn lane from the I-95 southbound off-ramp
- Relocated the Yield control on the I-95 on-ramp from the Civic Center Drive northbound left-turns to the Civic Center Drive southbound right-turns. Narrow up the Civic Center Drive southbound approach to slow vehicles entering onto the interstate
- Optimization of the timing for the coordinated traffic signal system at the intersection of Civic Center Drive and the I-95 southbound ramps
- Installation of overhead lane designation signs
- Installation of a “Left-Turn Yield on Green Ball” sign facing westbound Civic Center Drive traffic at the I-95 south lane ramp signals

Civic Center Drive at I-95 Northbound Ramps

- Installation of a fully actuated traffic control signal for the I-95 northbound off-ramp (to Civic Center Drive southbound) and the Civic Center Drive southbound approach, with the Civic Center Drive northbound approach to remain operating under free-flow control. The traffic signal was included within the coordinated traffic signal system on Civic Center Drive, which includes the intersections with I-95 southbound ramps, Garden Court/Community Drive, and Townsend Road
- Widened the I-95 off-ramp to two lanes
- Widen Civic Center Drive to provide a 150 foot long 12 foot wide exclusive left turn lane and two through lanes on Civic Center Drive at the I-95 northbound on-ramp
- Installation of a queue detector on the northbound off-ramp to prevent spill back onto I-95 main line
- Modification of the northbound on-ramp right turn slip lane to Yield control

Civic Center Drive between the I-95 northbound ramps to Garden Court

- Installation of a 4 foot wide raised median

Civic Center Drive at Garden Court and Community Drive

- Modification of the Civic Center Drive southbound approach to provide 350 foot long double left-turn lanes, two through movement lanes and a 250 foot long right turn lane
- Modification of the Garden Court westbound approach to provide an exclusive left-turn lane, a left through and a 250 foot long right-turn lane all under signal control
- Installation of center line painted skips between all dual turning movements
- Modification of the Civic Center Drive northbound approach to provide a 250 foot long left-turn lane, two through lanes and a 300 foot long right-turn lane all under signal control
- Installation of appropriate overlap traffic signal heads
- Installation of pedestrian crossing signals to accommodate a concurrent pedestrian crossing of Community Drive to Garden Court
- Optimization of the timing for the coordinated traffic signal system
- Modification of the Community Drive (roadway from the Civic Center) to provide a left/through lane and an exclusive right-turn lane
- Installation of appropriate overhead lane designation signs

Civic Center Drive at Townsend Road

- Installation of a traffic signal with protective left turn phases
- Optimization of the timing for the coordinated traffic signal system

- Upgraded the intersection to accommodate a concurrent pedestrian crossing from Community Drive across Civic Center Drive to Townsend Road

Townsend Road at Marketplace Drive

- Modification to provide a channelized island to prohibit left turns from Market Place Drive onto Townsend Road
- Installation of island to separate left turns from right turns for Townsend Road traffic turning onto Marketplace Drive

Townsend Road Corridor

- Installation of raised landscape islands for traffic calming measures

The projected traffic increase at Exit 112 cannot be absorbed by additional TSM strategies; therefore, the TSM Alternatives would not be a viable solution to accommodate future traffic needs in the study area.

C. Transportation Demand Management (TDM)

TDM efforts are a means of reducing traffic demand during peak periods by developing park-and-ride lots and ride-share programs (e.g., carpools or vanpools), encouraging flex-time work programs with employers and compressed work week schedules, and encouraging alternative modes of transportation such as bicycling and bussing.

The existing park-and-ride lot at Exit 112 is an example of a TDM.

The development of transit improvement alternatives is outside the scope of this study; however the Kennebec Valley Transit Service is evaluating this area in depth and will be releasing the study results in the Fall 2009. The results of that study will be reviewed and incorporated by MaineDOT into this IJR by technical memorandum, as appropriate, once it is completed. Tom Crikelair Associates' report, in Appendix I, identified that the proposed Exit 113 enhancements could provide greater viability for transit compared to an existing or enhanced Exit 112 because the Exit 113 enhancements:

- Provide a direct link between I-95 and Old Belgrade Road resulting in fewer miles traveled for the Waterville-Augusta bus route and
- The proposed link would reduce running time by five minutes for the Waterville-Augusta bus route.

Expanding transit service in the study area is projected to remove 16 to 30 local vehicles and 25 to 30 Waterville commuter vehicles in the Midday and PM peak hours. After a new regional hospital is developed on Old Belgrade Road, an additional 30 to 40 Waterville commuter vehicles could be eliminated during the Midday and PM peak hours.

The operations benefits of expanding transit service into the study area are not substantial enough to suggest transit as a standalone solution for the area. As it does have the potential to reduce vehicle demand in the area, it should continue to be considered as a complementary alternative to a capacity improvement alternative.

D. 2028 Reasonable Build Alternatives

The following sections describe the 2028 reasonable range of build alternatives. Included is a connector linking Exit 113 and Route 8/11/27 to the northwest. It should be noted that the alternatives are conceptual in nature and are not intended to be a detailed rendering of the proposed improvements.

Exit 113

Two alternatives were considered for this location. Both alternatives will modify Exit 113 from a directional interchange to a full interchange and will maintain the I-95 northbound to eastbound Route 3 free flow movement.

Alternative 1

This alternative replaces the current trumpet ramp design with a hybrid parclo interchange using the existing loop ramp in the northwest quadrant and providing a new loop ramp in the northeast quadrant. This alternative consists of a signalized intersection on the I-95 southbound ramp terminal and an unsignalized intersection on the I-95 northbound ramp terminal. With the 2028 volume projections, the northwesterly intersection requires four lanes on all approaches. This configuration includes a left turn, two through lanes, and a right turn for the Route 3 Connector approaches and dual lefts, a through, and a right turn lane for the I-95 southbound ramp and Old Belgrade Road approaches. The concept is shown in Figure 15.

Alternative 2

This alternative replaces the current trumpet ramp design with two-lane roundabouts, one at each of the northbound and southbound I-95 ramp termini. The Route 3 Connector would be configured as single lanes in each direction with flares to two lanes at the roundabout intersections. The northbound roundabout would have four legs including entrances and exits for eastbound and westbound Route 3, as well as an entrance for the northbound off-ramp and an exit for the northbound on-ramp. The southbound roundabout would have four legs including entrances and exits for Route 3, Old Belgrade Road, and the southbound on/off-ramp. The concept is shown in Figure 16.

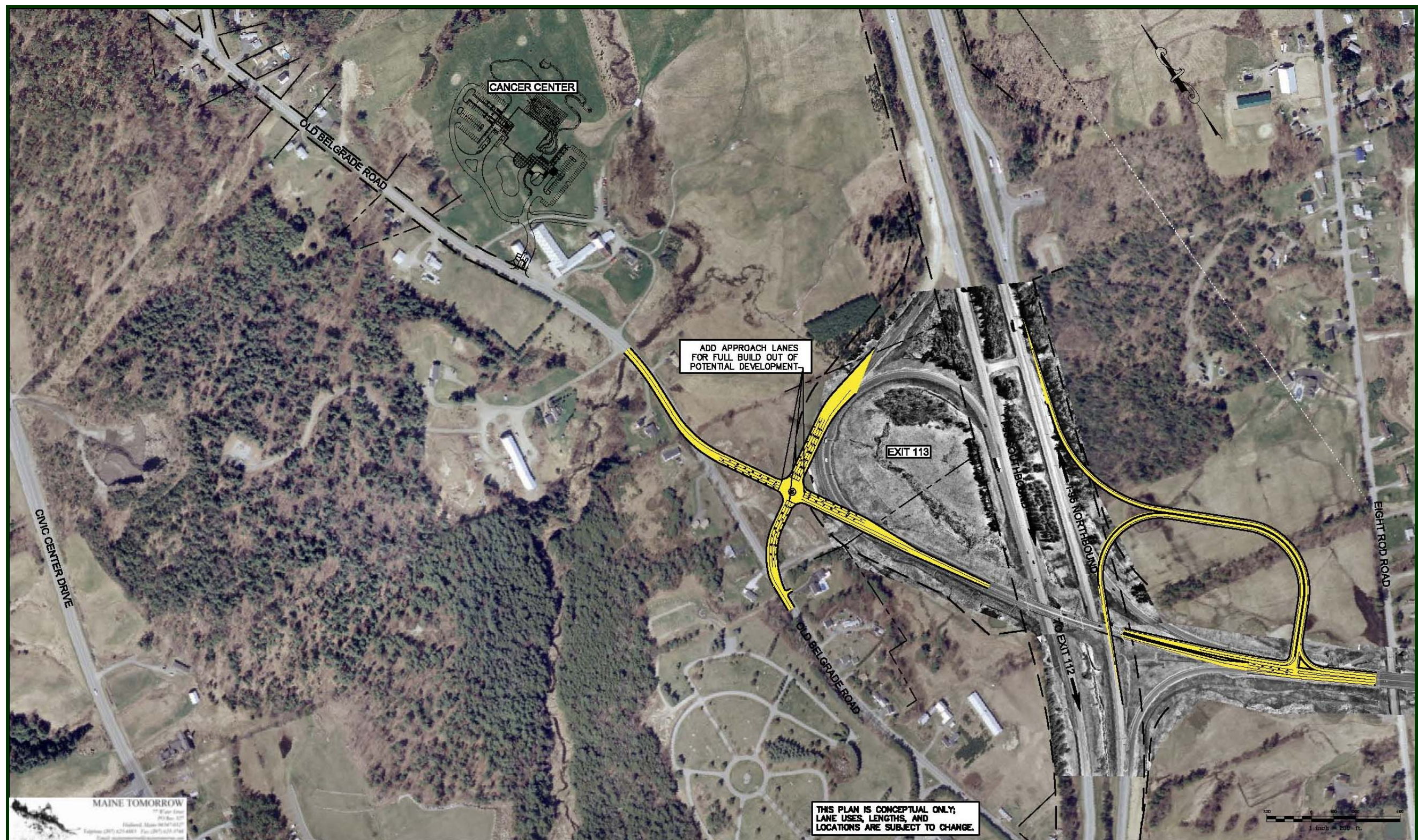


Figure 15. Traditional Full Interchange at Exit 113

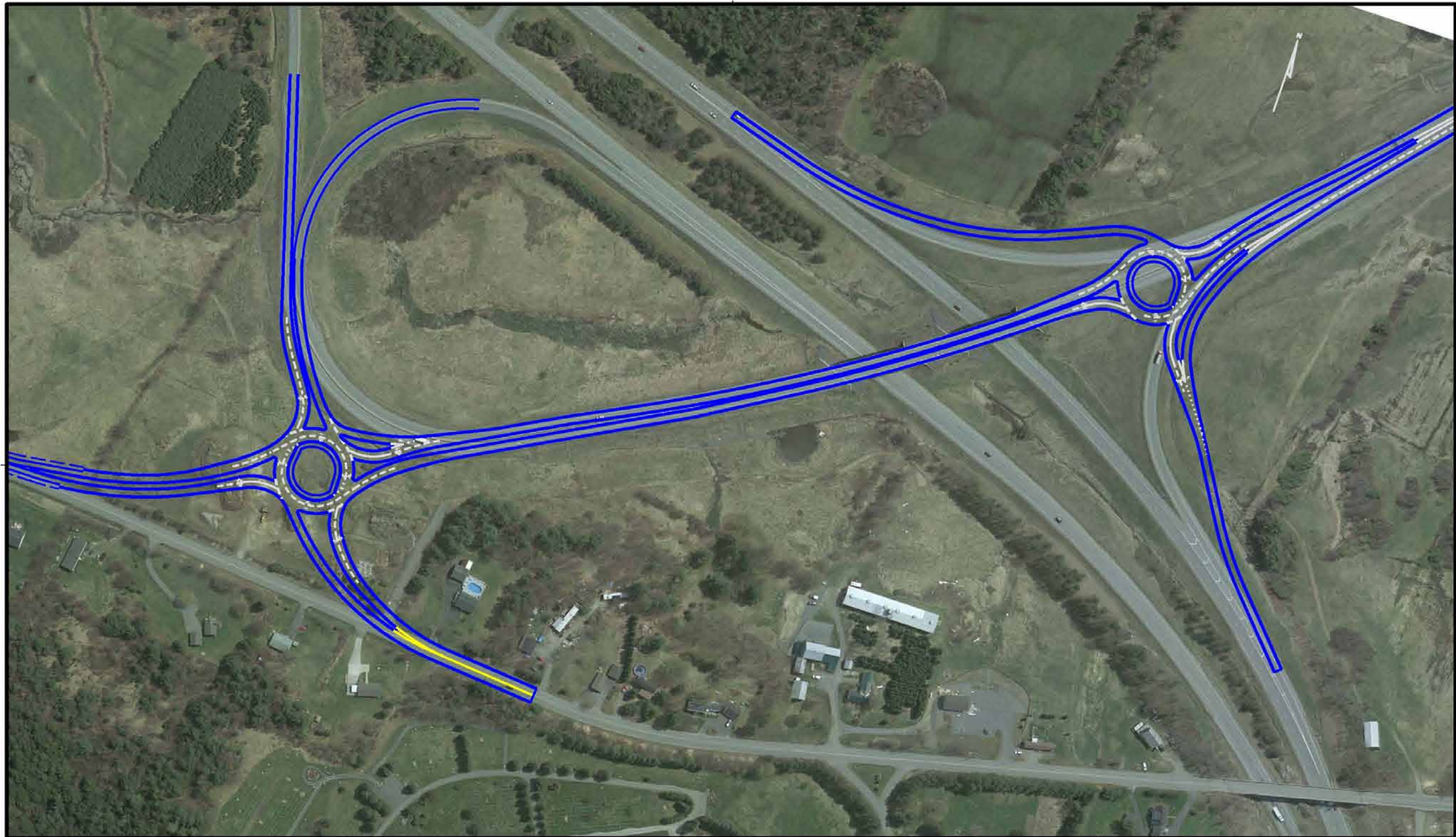


Figure 16. Roundabout Full Interchange at Exit 113: Two-Lane Overpass

Connection to Route 8/11/27

A full movement interchange at Exit 113 onto Old Belgrade Road could not be constructed without upgrading the immediate roadway network around the proposed interchange to accommodate the increase in traffic volume that such an interchange would generate. The two alternatives include: (1) the upgrade of Old Belgrade Road and (2) a new highway connector. Both alternatives would be two lanes wide and built to arterial standards.

Alternative 1A and 2A

Alternative 1A and 2A involves an upgrade of Old Belgrade Road between the modified Exit 113 interchange and Route 8/11/27. The alternative corridor is approximately one mile long, with the entire corridor consisting of roadway rehabilitation or reconstruction (i.e., there is no portion on new alignment). The existing access points would remain but additional access rights would be acquired with full controlled access approximately 300 feet from the modified I-95 southbound ramp terminus. This alternative would require intersection improvements to Bog Road / Old Belgrade Road, Old Belgrade Road / Belgrade Road, Bog Road / Belgrade Road. The concept for the upgrade of Old Belgrade Road is shown in Figure 17.



Figure 17, Old Belgrade Road Upgrade Concept

Alternative 1B and 2B

The Alternative 1B and 2B corridor is approximately one-half mile long. The entire one-half mile corridor would consist of roadway construction on new alignment. It would originate from the modified Exit 113 interchange and terminate northwesterly at Route 8/11/27 in the vicinity of Commerce Drive. This alternative would be a partial controlled access highway with a limited number of openings for future public access. The concept for the new highway connector is shown in Figure 18.



Figure 18, New Highway Connector Concept

Exit 112

Two alternatives were considered for this location. Both alternatives would require the widening of the I-95 overpass bridges to accommodate six lanes of traffic on Civic Center Drive.

Alternative 3

This alternative would require a six-lane roadway corridor from Darin Drive to the Civic Center Drive and I-95 northbound on/off ramp terminal with additional widening at the intersections for exclusive left-turn and right-turn lanes. This alternative would install traffic signal control at Darin Drive. Additionally, the following movements would be included under traffic signal control: I-95 southbound off-ramp right turn to Civic Center Drive westbound, Civic Center Drive eastbound right turn to I-95 southbound, I-95 northbound off-ramp right turn to Civic Center Drive westbound, Civic Center Drive right turn to I-95 northbound on-ramp, and Civic Center Drive eastbound left turn to I-95 northbound on-ramp. Under this alternative, left turns from Darin Drive would be eliminated and relocated to Leighton Road. The concept for the traffic signals is shown in Figure 19.

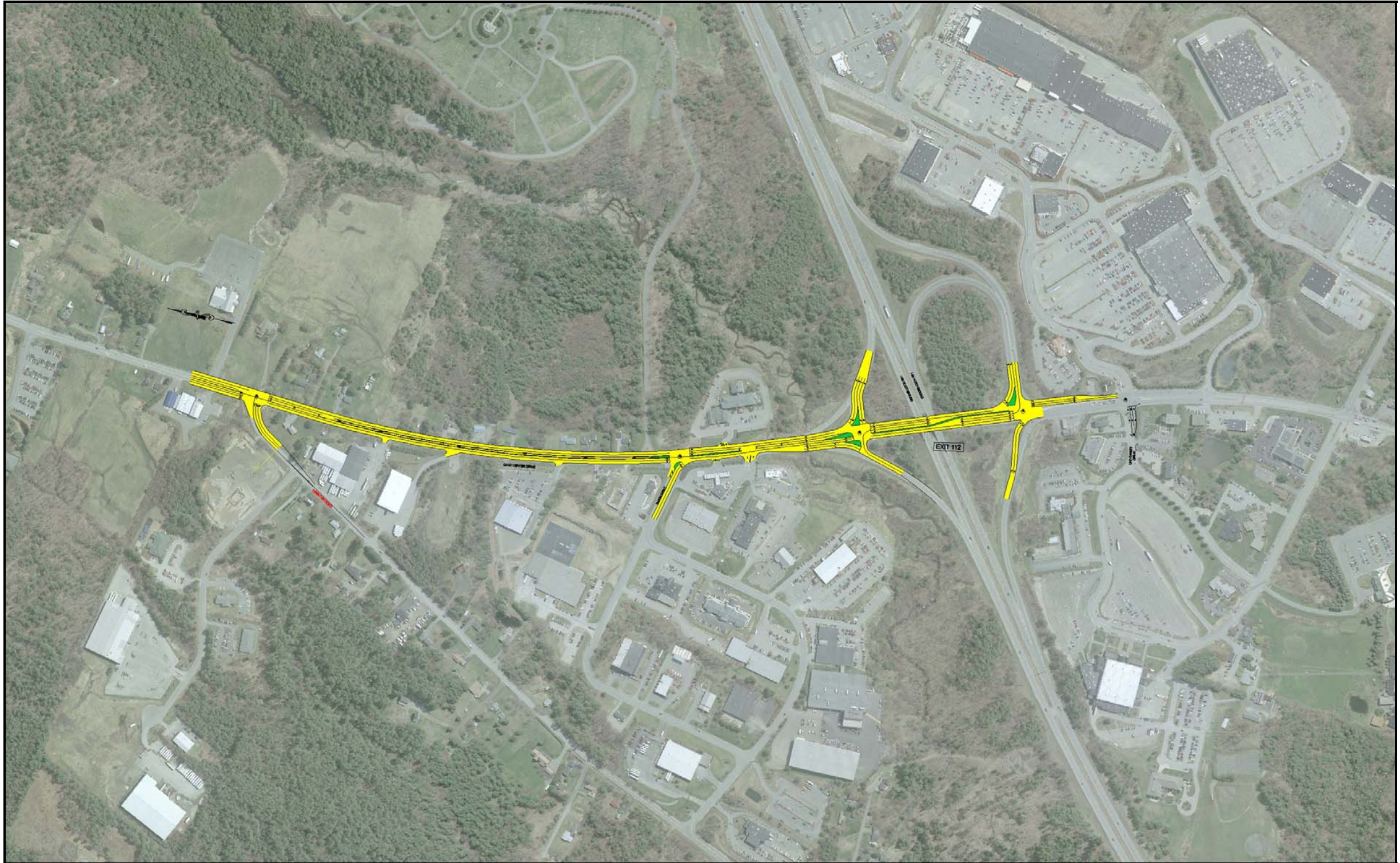


Figure 19, Signalized Alternative at Exit 112

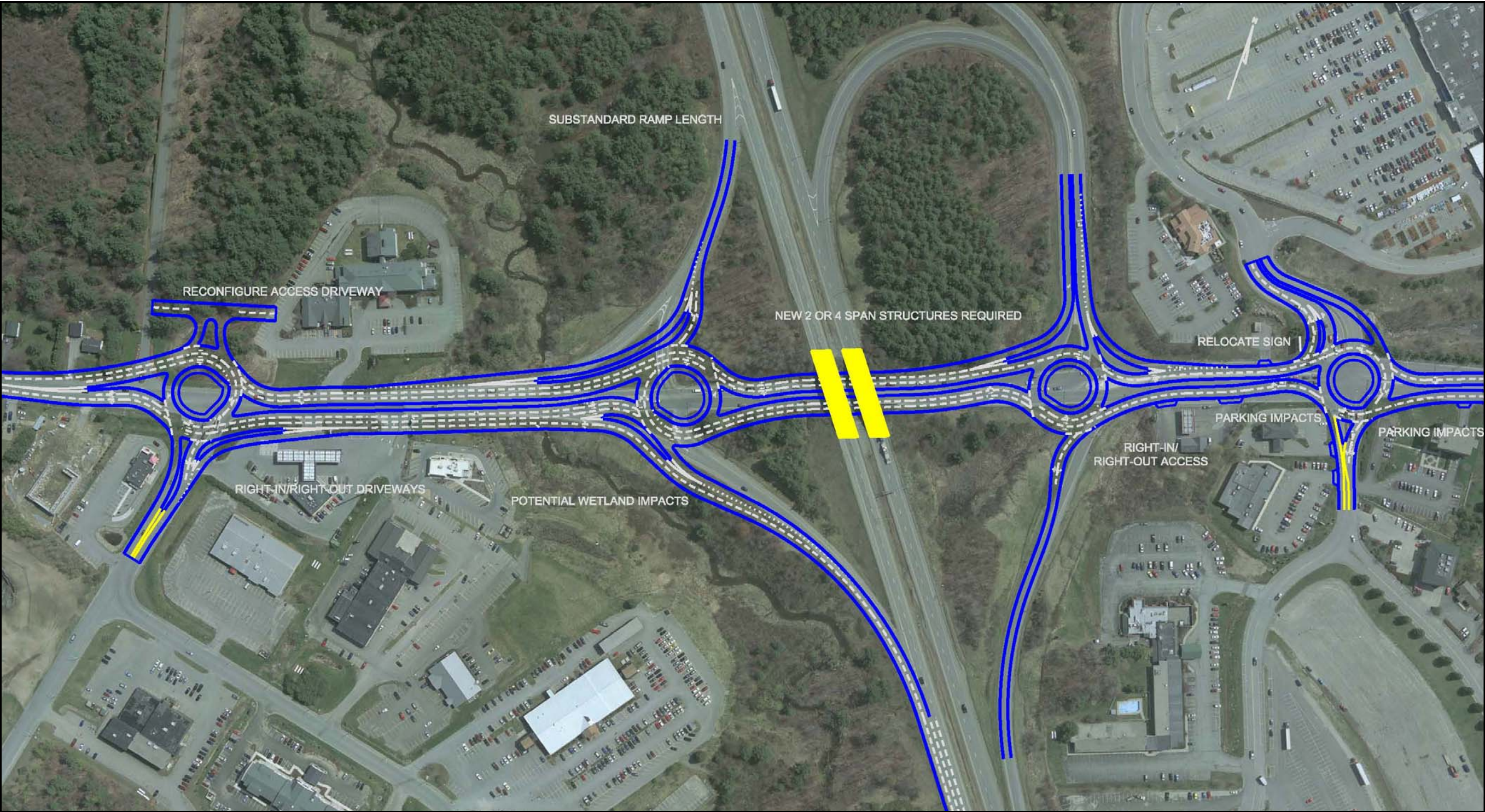


Figure 20. Three-Lane Roundabout Alternative at Exit 112

Alternative 4

Alternative 4 would require the construction of four roundabouts on Civic Center Drive between Garden Court and Darin Drive. The roundabout alternative would require a six-lane roadway corridor from Darin Drive to the I-95 northbound on/off ramp terminal. A two-lane roadway section is required from the I-95 northbound on/off ramp terminal to Townsend Road. By including roundabouts, center medians could be incorporated to a greater extent than the previous concept while still allowing drivers to travel to and from each direction. The concept for the roundabouts is shown in Figure 20.

V. Traffic Operations Analysis

A major element of this IJR is the evaluation of operating conditions within the study area relative to existing and future traffic mobility. To assess mobility, capacity and level of service (LOS) analyses were conducted for following intersections:

- Civic Center Drive at Garden Court and Community Drive;
- Civic Center Drive at I-95 northbound on/off ramps;
- Civic Center Drive at I-95 southbound on/off ramps;
- Civic Center Drive at Darin Drive; and
- Civic Center Drive at Leighton Road and Belgrade Road.

Several different software tools were utilized for the traffic analysis, determination of the proper tool was based on the capabilities of the various traffic analysis software tools. Highway Capacity Software (HCS) based on the Highway Capacity Manual (HCM) methodologies was requested by FHWA to be utilized as the primary analysis tool for the I-95 ramp LOS and queue lengths.

On Civic Center Drive, the adjacent intersections, including progression between adjacent intersections has an impact on the operation of an isolated intersection. The HCM analysis may portray a better or worse picture than actual field operations under congested conditions because the analysis methodologies do not take into consideration upstream or downstream effects. Therefore, the HCM analysis was supplemented with Synchro/SimTraffic analysis program. This program models all vehicles traveling through a roadway network by simulating individual vehicle traffic flow. Inputs to the model include roadway geometrics, lane use, intersection control operation, intersection turning movements, and system traffic volume. As the model runs, the location of each vehicle in the model network is tracked for each second of time. With this location and time data compiled for each vehicle, the model then computes a variety of measures-of-effectiveness (MOE's) for each intersection approach by lane and traffic movement. This comprehensive list of MOE's includes delay per vehicle, along with, 50th percentile, 95th percentile and maximum queue lengths by lane. The primary benefit of SimTraffic is that it allows the analyst to view traffic simulation flows in real time. This allows the analysis of the effects of different alternatives to be compared and contrasted more easily than with mathematical analysis alone. The model results reported for each alternative are based on an average of results from five random simulations of that alternative.

Although Synchro and SimTraffic have the capability of modeling a roundabout, their ability to accurately model multi-lane facilities is limited. Therefore, the traffic operations for the roundabouts were analyzed using RODEL 1.9.7 roundabout design and capacity analysis software. The 50th percentile confidence level (CL) was used in the RODEL capacity analysis to represent the most probable capacity of the roundabout, and to be consistent with confidence levels inherent in typical signalized and un-signalized capacity analysis methodologies. Similarly, average delay, as opposed to maximum delay,

was used to be consistent with signalized and un-signalized methodologies. Also performed was capacity analysis at an 85 percent confidence level to determine if the forecasted level of service and average delay is predicted to be in the sensitive area of the delay curve.

When considering the operation of two or more roundabouts in close proximity to each other, the expected queue length at each roundabout becomes more important. In this study the expected queues for each approach have been computed to check that sufficient queuing space is provided for vehicles between the roundabouts. If space between intersections is not sufficient to store the 95th percentile predicted maximum queues, then the operations predicted by RODEL cannot be realized.

A further complication of closely spaced intersections at ramp terminals is lane utilization and lane continuity. In series, roundabouts must be configured to feed traffic from an upstream exit of one roundabout such that lane utilization and lane continuity promote minimal lane changes and maximum lane use downstream. Designs must account for upstream lane choice and downstream lane use otherwise capacities can be overestimated and queuing can be underestimated.

Capacity is defined as the “maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of a lane or roadway during a specific time period under given roadway, geometric, traffic, environmental, and control conditions”. Conditions or factors that affect capacity include the number of travel lanes, lane and shoulder width, lateral clearances, alignment, the characteristics of vehicles in the traffic stream, and traffic control and regulations in existence.

LOS is a qualitative measure describing operational conditions within a traffic stream taking into account a number of variables such as speed and travel time, vehicles maneuverability, traffic interruptions, comfort, and convenience. There are six levels of service from LOS “A” to LOS “F”, with LOS “A” representing the best operational condition and LOS “F” representing the worst, often when traffic demands exceed capacity. Each level of service represents a range of operating conditions and the driver’s perception of those conditions.

The LOS criteria for signalized and un-signalized intersections, as developed in the *2000 Highway Capacity Manual, Special Report 209*, are summarized in Table 8.

Table 8: Level of Service Criteria for Intersections

Level of Service	Signalized Delay ¹ (sec)	Unsignalized Delay ² (sec)	Typical Roadway Conditions
A	≤ 10	≤ 10	Primarily free-flow operations. Control delay at intersections is minimal
B	> 10 to 20	> 10 to 15	Ability to maneuver in traffic is slightly restricted. Delay at intersections is not significant.
C	> 20 to 35	> 15 to 25	Stable operations with ability to maneuver in traffic being restricted. Delay at intersections may contribute to congestion.
D	> 35 to 55	> 25 to 35	Small increases in traffic volumes may cause substantial increases in delay. Congestion at intersections is apparent.
E	> 55 to 80	> 35 to 50	Significant delay and poor travel speeds can be expected. Intersections experience significant delay and queuing.
F	> 80	> 50	Delays are at unacceptable levels for most drivers. Roadway network capacity has been exceeded.

Source: Highway Capacity Manual 2000, Transportation Research Board

1 Average control delay per vehicle for all vehicles

2 Average control delay per vehicle

A. Capacity Analysis Methodology and Assumptions

For the purposes of the analysis, the following methodology and assumptions were used for existing and future conditions:

- Peak Hour Factor (PHF) – 0.95
- Percent heavy vehicles – 2 percent
- 2007 count data was grown to the base year of 2008 by applying a historical growth factor of 1 percent or 2 percent
- If needed, count data was multiplied by MaineDOT’s Seasonal Adjustment Factors to account for the seasonal variation of the traffic data
- The retail and commercial driveways were not adjusted annually or seasonally
- The back access road from the Augusta Marketplace onto Old Belgrade Road is functional, Traffic Movement Permit Application for Augusta Marketplace Mall Phase 3 (Div. 04-00028-A-N)
- Trip assignments for the projected development were based on prior traffic impact studies completed in the area, and were adjusted as necessary to reflect proposed changes in the roadway network
- Where applicable, intersection volumes were balanced along Civic Center Drive (adjusting the volumes so that the volume exiting an intersection equals the volume entering the adjacent intersection). For the purpose of this study, traffic volumes for the heavy traffic generators such as Irving Oil that exist between intersections were not balanced. The adjusted 2008 existing traffic volumes for the Midday and PM peak hours are shown in the Appendix B Figures 5 and 6. The adjusted 2028 future traffic volumes for the Midday and PM peak hours are shown in the Appendix B Figures 7 and 8
- Existing traffic volumes were redistributed for the Exit 113 Build as follows (Appendix B Figures 13 and 14):
 - Gabriel Drive and redistribution to match that of Development Location 1
 - Commerce Drive same redistribution to match that of Development Location 2
 - Augusta Marketplace
 - 20% redistribution from south
 - 50% redistribution from north
 - 20% redistribution from east
 - 50% traffic pass-by
 - 10% of Civic Center Drive traffic to and from north reassigned
 - 10% of Bog Road crossing Old Belgrade Road reassigned
 - 5% of Civic Center Drive traffic to and from south reassigned
- The average of five SimTraffic runs were performed for the Midday and PM peak hours existing, 2028 No-Build, and Exit 112 and Exit 113 Build conditions
- The Synchro and SimTraffic analyses along Civic Center Drive were based on the elimination of left turns from Darin Drive (due to capacity impositions placed upon the remaining entering traffic at this intersection by these left turns) and relocating them to Leighton Road

The operational performance was analyzed for the Midday peak hour and PM peak hour for the following conditions:

- 2008 Existing
- 2028 No-Build
- 2028 Exit 113 Build
- 2028 Exit 112 Build

The 2008 existing conditions analysis was conducted using the existing volumes summarized in Appendix B Figures 5 and 6. The analysis of 2028 No-Build and Exit 112 Build was conducted using the future year volumes summarized in Appendix B Figures 11 and 12. The analysis of 2028 Exit 113 Build was conducted using the future year volumes summarized in Appendix B Figures 19 and 20.

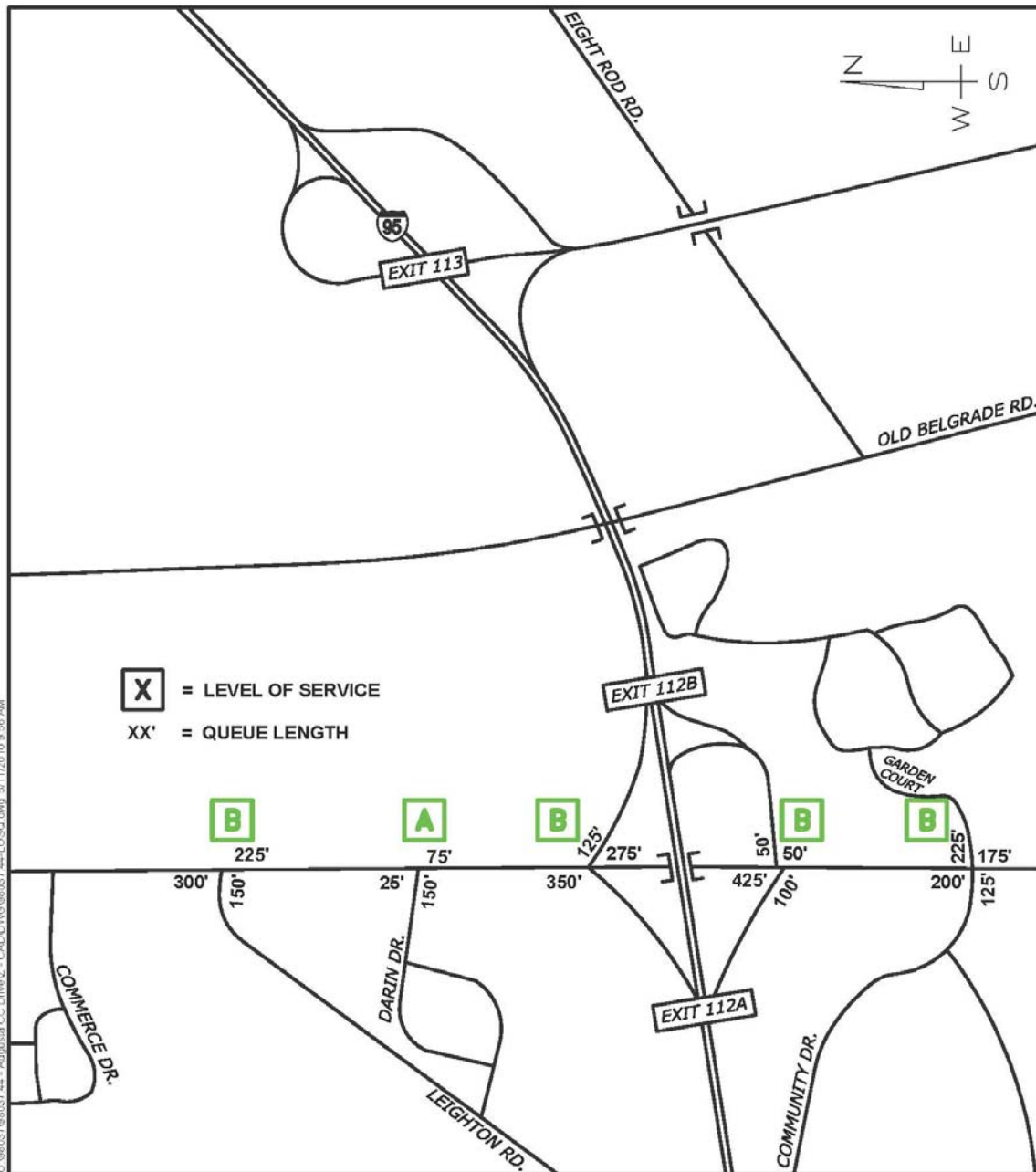
B. 2008 Existing

Existing traffic conditions in the study area were analyzed based on the methodologies described above and the existing peak hour volumes in the Appendix B Figures 5 and 6. The existing conditions and No-build scenario operations analyses describe the anticipated “baseline” study area traffic conditions.

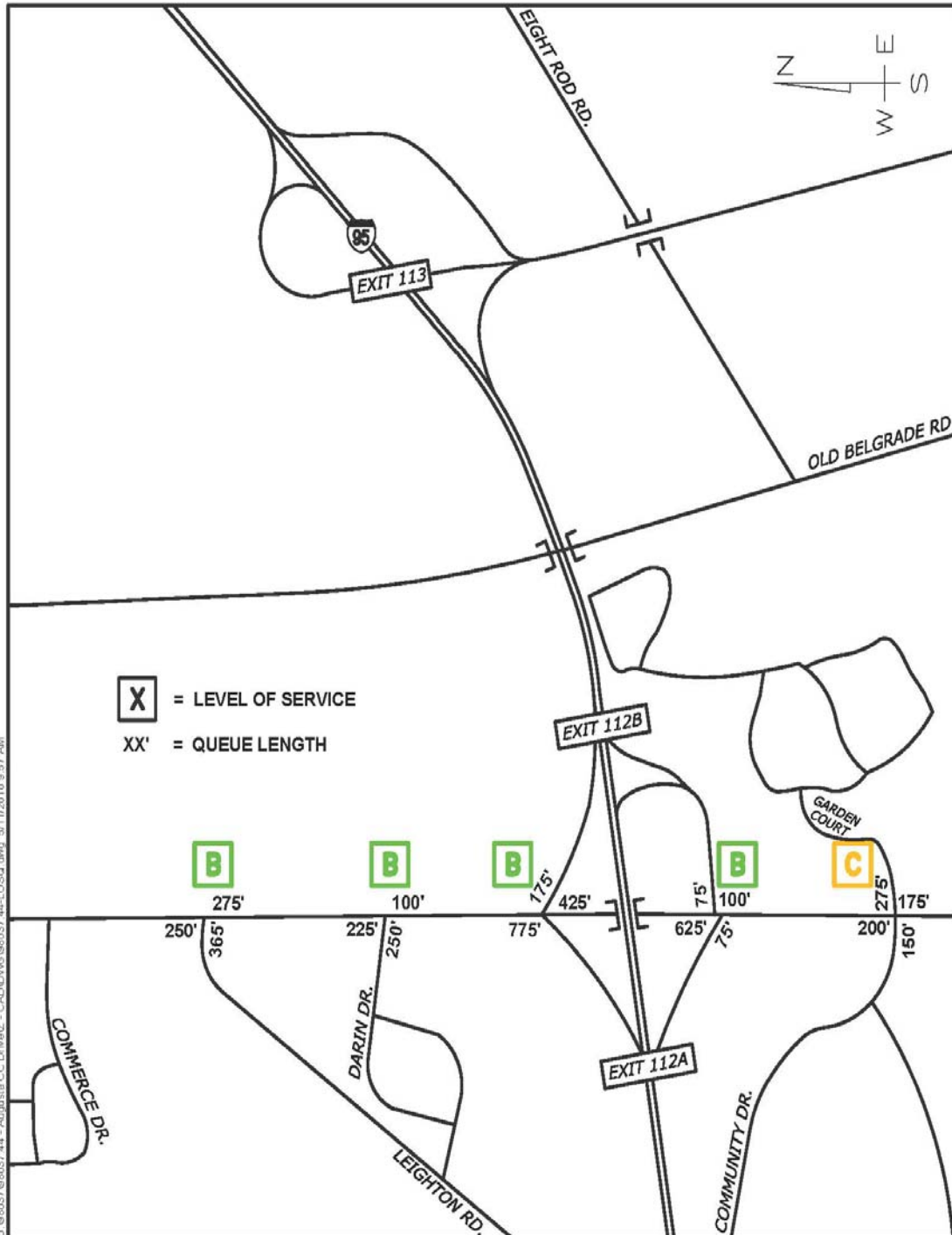
The existing conditions traffic operations results are provided in Figures 21 and 22. The detailed results are included in Appendix E. All five intersections, as discussed in Section V. Traffic Operations Analysis, operate at LOS D or better in the Midday peak hour and PM peak hour, except the following intersection approaches:

- Civic Center Drive at Darin Drive - The Darin Drive approach currently operates at LOS E during the PM peak.
- Civic Center Drive at I-95 northbound on/off ramps - The Civic Center Drive southbound left-turn approach currently operates at LOS E during the PM peak.
- Civic Center Drive at I-95 southbound on/off ramps - The Civic Center Drive southbound approach currently operates at LOS F during the PM peak.

The traffic modeling runs showed that the close proximity between the intersections and driveways along Civic Center Drive causes some links to fill up and spill over into the adjacent intersections and driveways. Excessive queue lengths with driveway blocking are reported at the Civic Center Drive southeast approach from the I-95 southbound on/off-ramp. In addition, queue lengths of over 200 feet are reported at the Darin Drive approach to Civic Center Drive. These queues may cause additional degradation of the LOS that is not reflected in the calculations.



EXISTING TRAFFIC OPERATIONS AND QUEUE LENGTHS



EXISTING TRAFFIC OPERATIONS AND QUEUE LENGTHS

C. 2028 No-Build

By 2028, No-Build peak hour intersection total entering volumes associated with intersections on Civic Center Drive are projected to increase by 35 percent to 196 percent in the Midday peak hour and 37 percent to 163 percent in the PM peak hour. As a result of these increases, Civic Center Drive in the vicinity of the I-95 Exit 112 ramps is forecasted to exceed capacity resulting in network gridlock. Because of this gridlock, no meaningful measures of effectiveness such as level of service or queuing can be obtained. Since there is network gridlock, the study area intersections would be considered to operate at levels of service “F”. Although no meaningful queuing results can be obtained from the analysis due to the gridlock, it can be expected that Mainline I-95 through traffic would be disrupted by queued vehicles at the Exit 112 northbound and southbound off-ramps.

Based on the results of the 2028 No-build conditions, there is an identified need for capacity improvements to address the identified study area transportation network deficiencies.

D. 2028 Exit 113 Build

The 2028 Exit 113 Build condition represents the design year of the proposed improvements, and is based on the alternatives discussed in Section IV.D.

Alternative 1 (Conventional Signalized and Unsignalized Intersections)

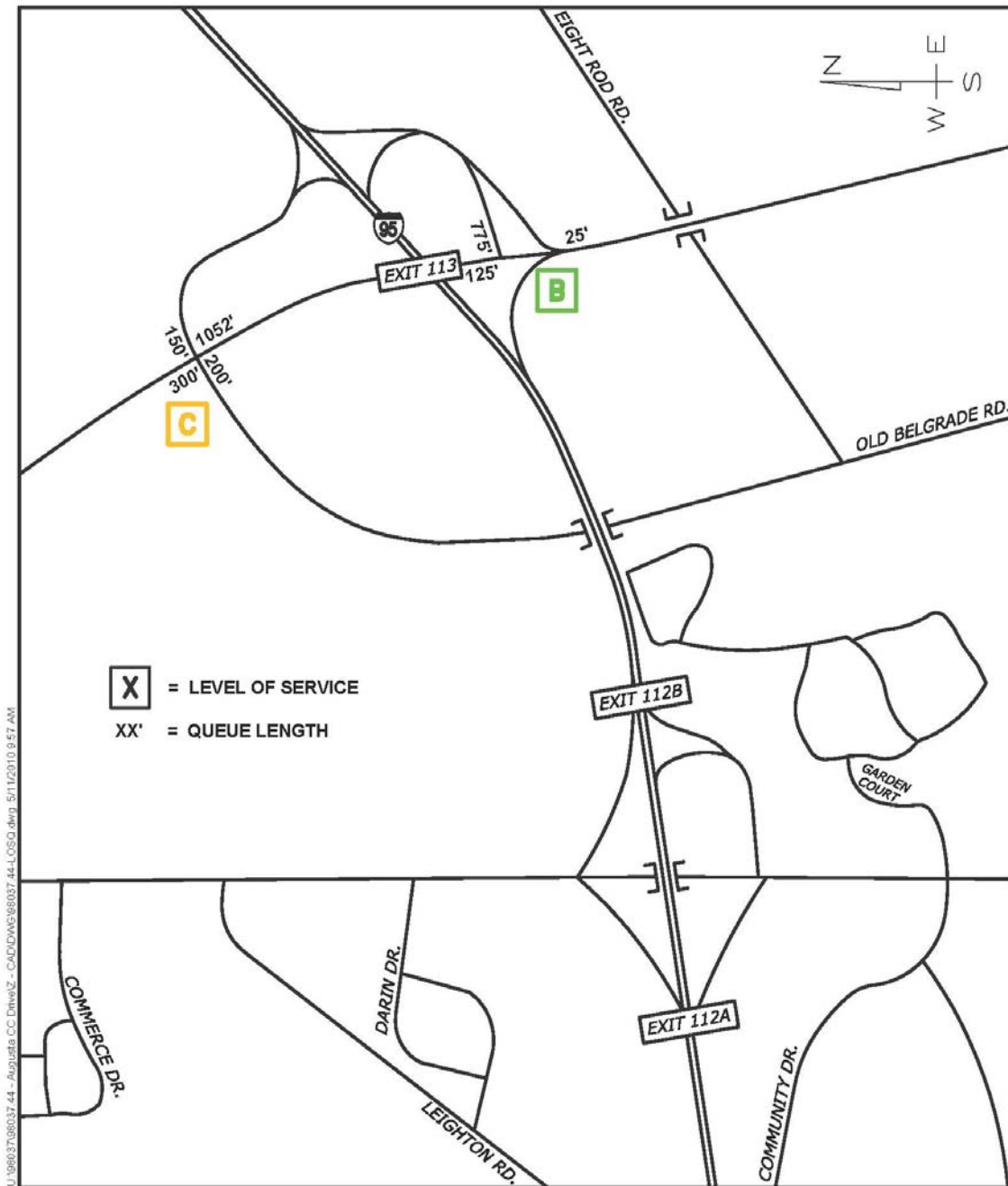
The results of the Midday and PM peak hour period build assessment are documented in Figures 23 and 24. The detailed results are included in Appendix E.

Both the signalized intersection for the southbound ramps and the unsignalized intersection for the northbound ramps are forecast to operate at acceptable levels of service “C” and “A/B” respectively. The most significant queue would be for the westbound direction at the southbound ramps in the Midday Peak Hour direction. This queue is forecast to be 1,052 feet in length which would extend back to the I-95 bridge. Queue length for the northbound off-ramp in the Midday Peak Hour is also forecast to be substantial at 775 feet. Queue for the eastbound direction in the PM peak hour at the southbound ramps is forecast to be 650 feet.

Alternative 2 (Roundabouts)

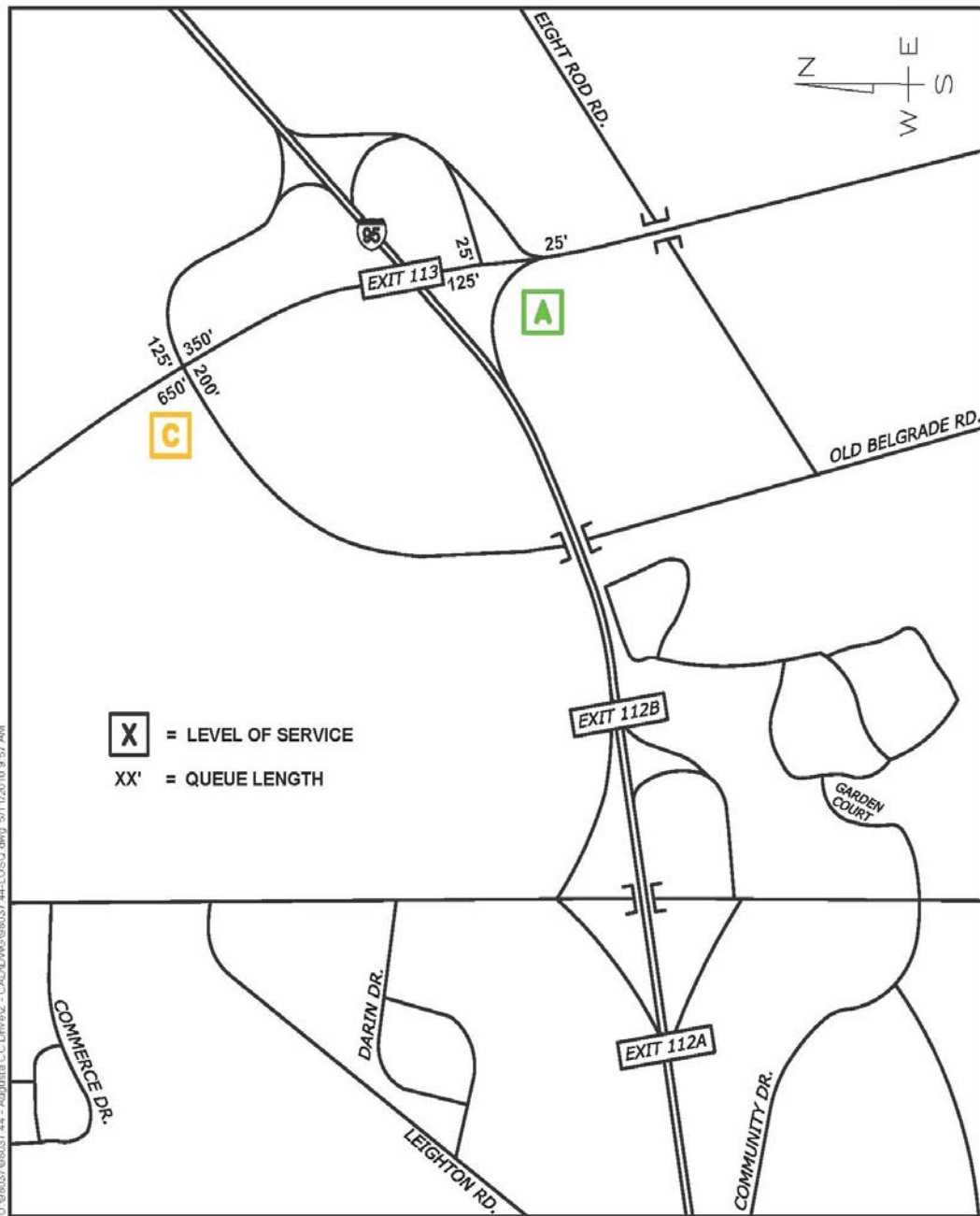
The results of the Midday and PM peak hour period build assessment are documented in Figure 24. The detailed results are included in Appendix E.

The ramp termini roundabout intersections will operate at a LOS A with overall delay of less than 6 seconds. The maximum queue distance on the corridor is expected to be 125 feet at the easterly roundabout Route 3 northbound approach. The analysis indicates a single lane roundabout would be required up to 66 percent of development. At that time, the single lane roundabouts would need to be converted to two-lane roundabouts. The southbound I-95 off-ramp has the least residual capacity with failure occurring with 18 percent additional traffic beyond the 2028 projections. The other roundabout entries along this corridor have residual capacities of up to 22 percent beyond the 2028 projections.

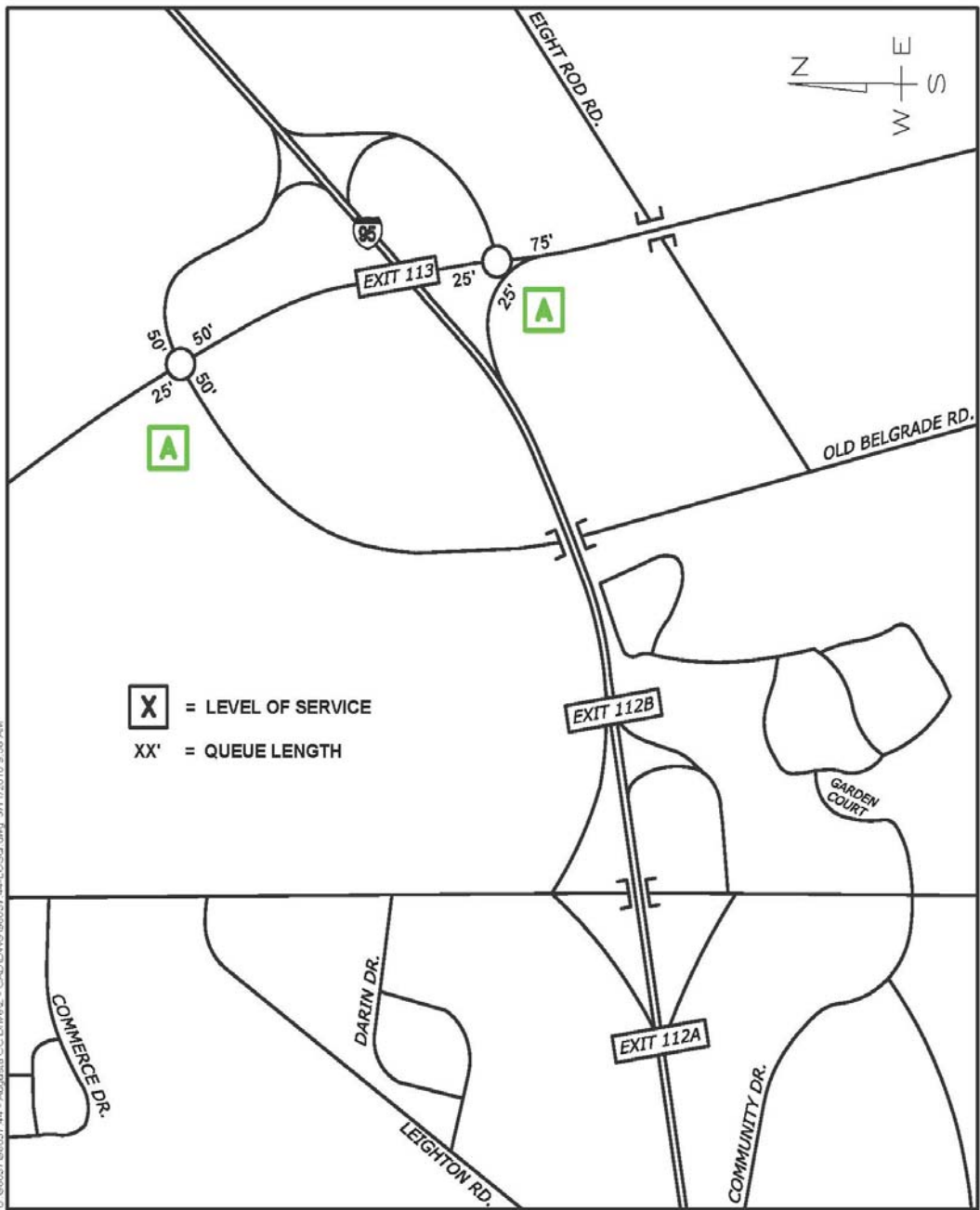


**TRAFFIC OPERATIONS AND QUEUE LENGTHS
EXIT 113 - SIGNAL/UNSIGNALIZED**

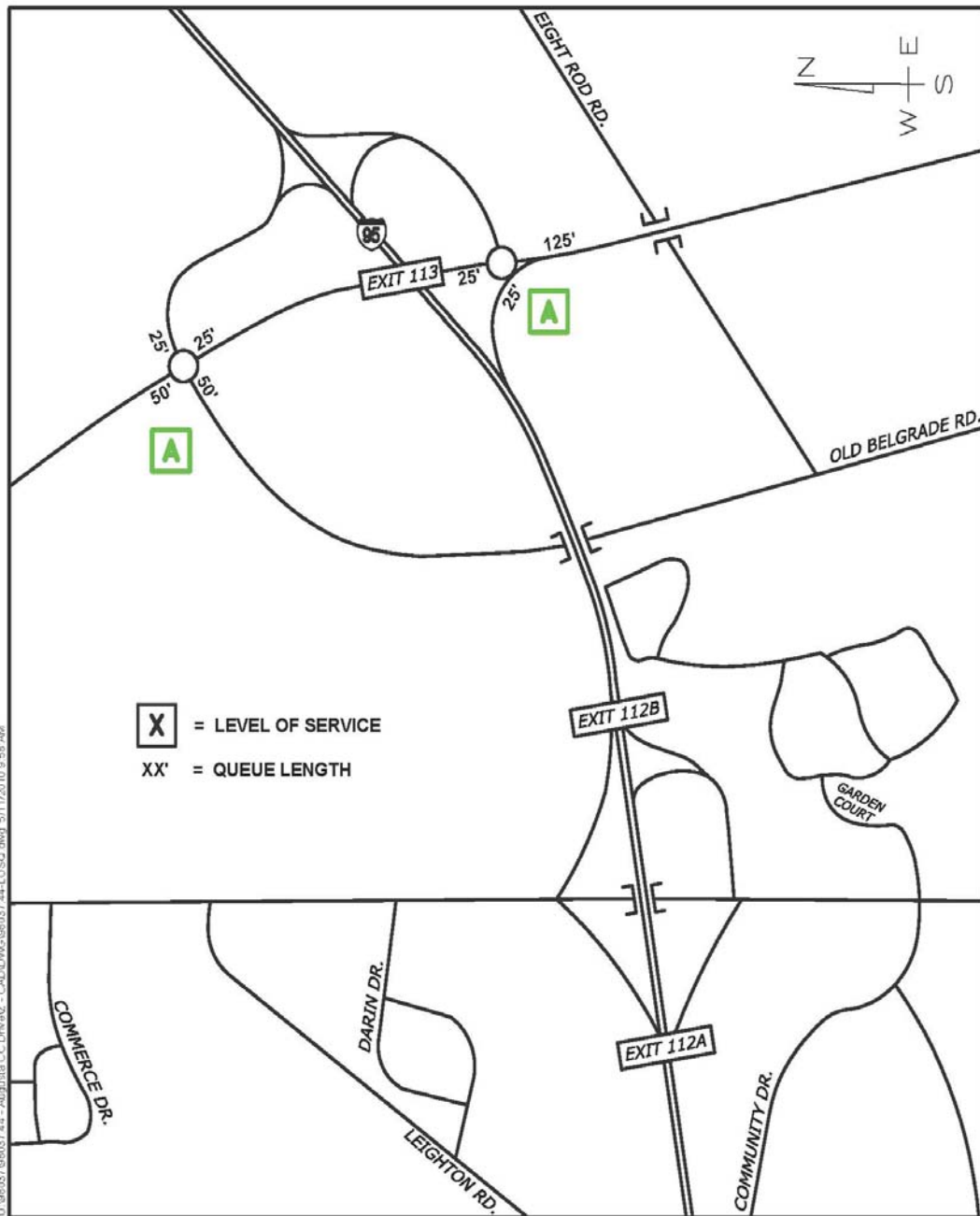
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TRAFFIC OPERATIONS AND QUEUE LENGTHS
EXIT 113 - SIGNAL/UNSIGNALIZED



TRAFFIC OPERATIONS AND QUEUE LENGTHS
EXIT 113 - ROUNDABOUTS



TRAFFIC OPERATIONS AND QUEUE LENGTHS
EXIT 113 - ROUNDABOUTS

E. 2028 Exit 112 Build.

The 2028 Exit 112 Build condition represents the design year of the proposed improvements, and is based on the alternatives discussed in Section IV.C. 2028 Build Alternatives. These alternatives assume no changes to the existing Exit 113 configuration.

Alternative 3 (Signals)

The results of the Midday and PM peak period build assessment are documented in Figures 27 and 28. The detailed results are included in Appendix E.

The following sections describe the approaches that operate at or near capacity (LOS E) or have a breakdown in flow (LOS F) during the 2028 Build conditions. All other approaches operate at LOS D or higher.

Civic Center Drive at Darin Drive

The Civic Center Drive southbound approach is forecast to operate at LOS F in the Midday peak and PM peak. The Civic Center Drive northbound left-turn approach is forecast to operate at LOS F in the Midday peak, and the Darin Drive approach is forecast to operate at LOS E in the PM peak.

Civic Center Drive at I-95 Southbound Ramps

The Civic Center Drive northbound left-turn approach is forecast to operate at LOS E in the Midday peak and PM peak. The I-95 westbound right-turn approach is forecast to operate at LOS E in the Midday peak.

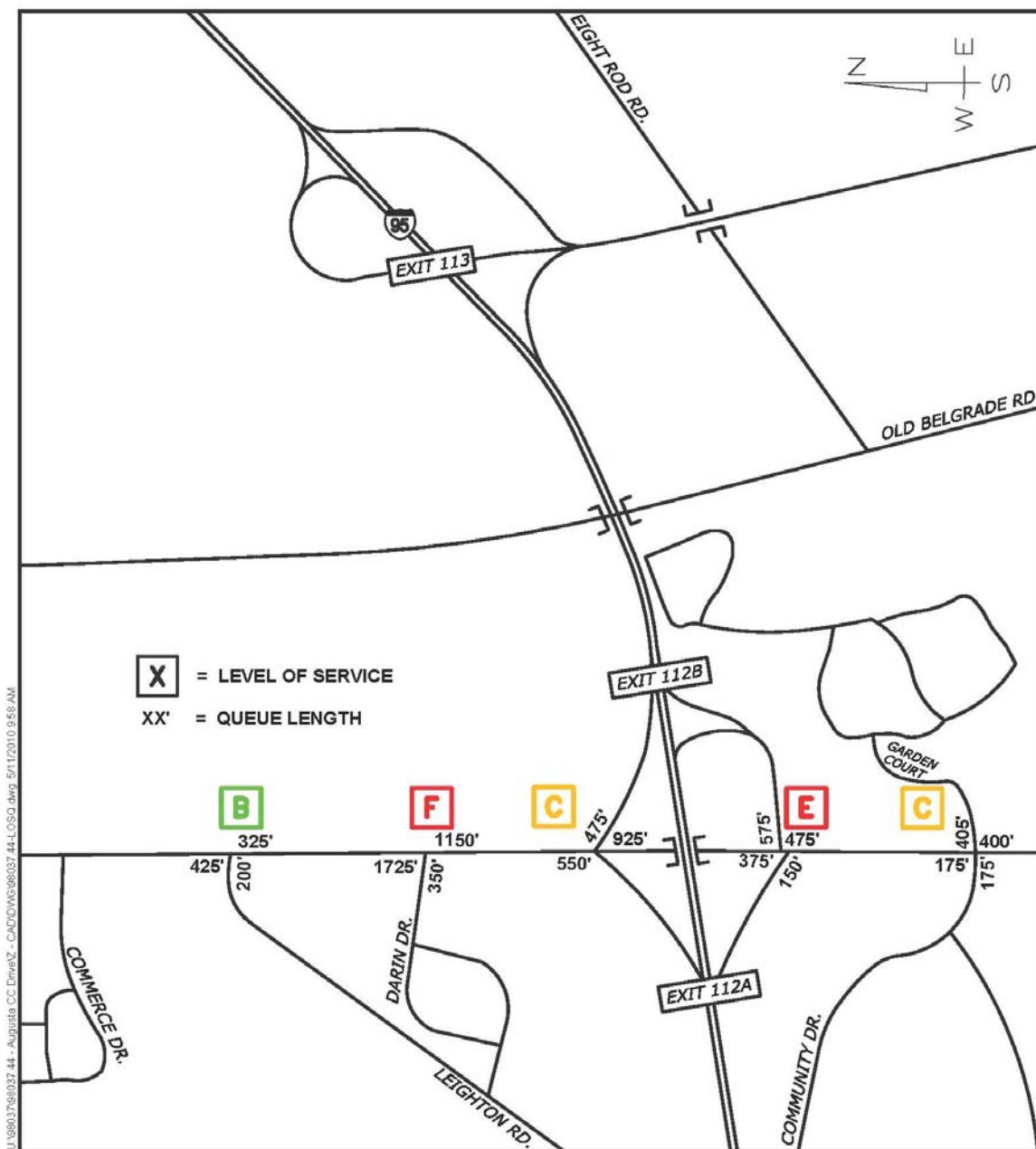
Civic Center Drive at I-95 Northbound Ramps

The Civic Center Drive at the I-95 northbound on/off-ramp is forecast to operate at an overall LOS E for the Midday peak with the I-95 westbound right-turn approach forecast to operate at LOS F in the Midday peak.

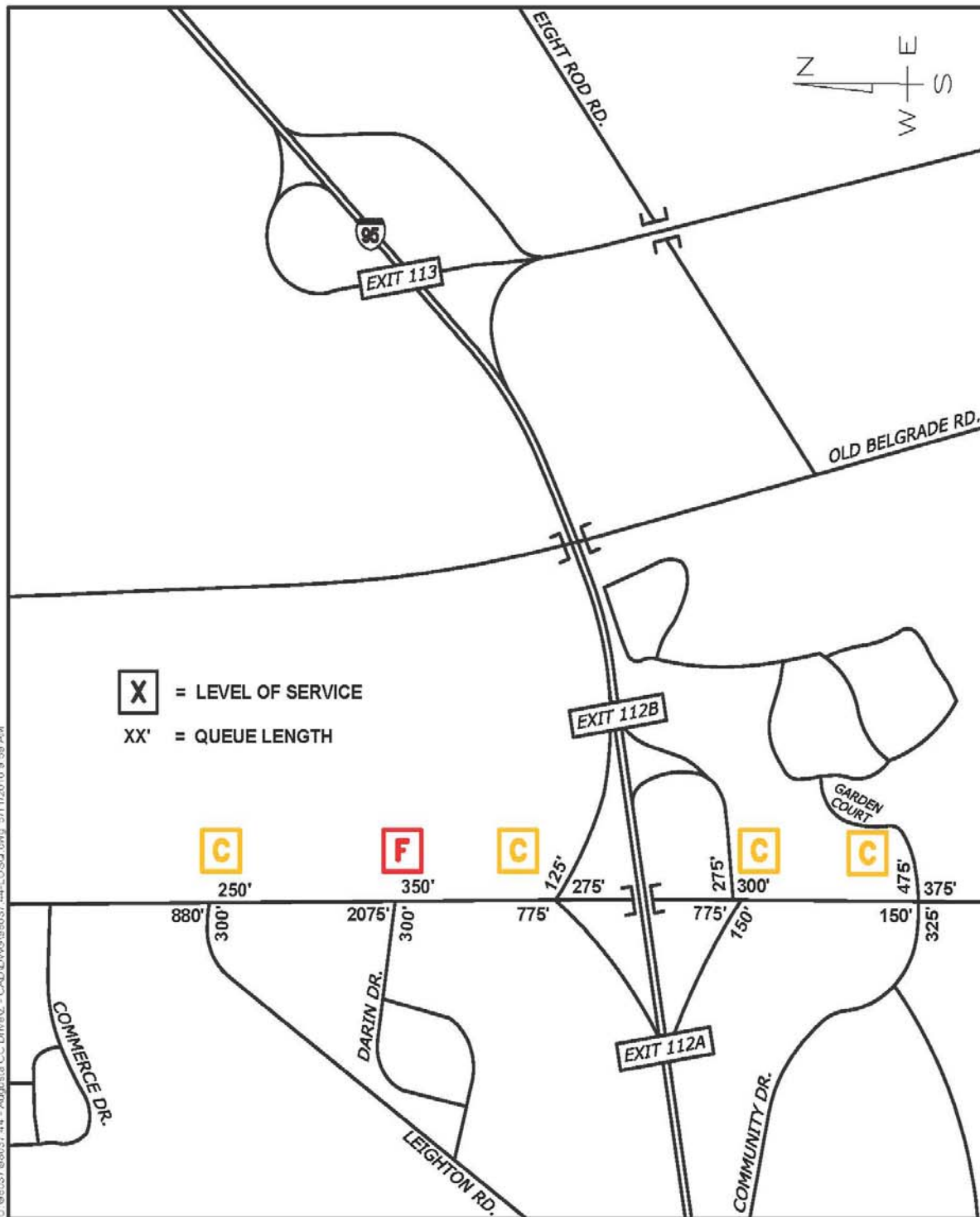
Civic Center Drive at Garden Court and Community Drive

The Community Drive through approach is forecast to operate at LOS E in the Midday peak and PM peak with the left-turn approach forecast to operate at LOS E in the PM peak. The Garden Court left-turn and the Civic Center Drive left-turn approaches are forecast to operate at LOS E in the PM peak.

In 2028 queuing along Civic Center Drive is almost half a mile to the northwest of Darin Drive during the PM peak hour and a quarter mile to the southeast of Darin Drive during the Midday peak hour. This queue extends to the I-95 southbound on/off-ramps resulting in vehicle queuing of the I-95 southbound off-ramp to the I-95 mainline at times. The queuing for southeasterly through traffic on Civic Center Drive at Leighton Road is anticipated to approach 700 feet. As with the 2008 existing conditions, these queues may cause degradation of the LOS that is not reflected in the calculations.



**TRAFFIC OPERATIONS AND QUEUE LENGTHS
WITHOUT FULL EXIT 113 - SIGNALS FOR EXIT 112**



TRAFFIC OPERATIONS AND QUEUE LENGTHS
 WITHOUT FULL EXIT 113 - SIGNALS FOR EXIT 112

Alternative 4 (Roundabouts)

The results of the Midday and PM peak period build assessment are documented in Figure 27. The detailed results are included in Appendix E.

The roundabout intersections are expected to operate at a LOS A with overall delay of less than 10 seconds. The maximum queue distance with the roundabout alternative is expected to be 100 feet. Residual capacity of each intersection was calculated as the percentage increase in total entering traffic beyond the 2028 projection that would result in a leg operating at LOS E. Increases were assumed to occur equally on all legs until one leg failed. In this scenario, the I-95 southbound off-ramp entry has the least residual capacity with failure occurring with 9 percent additional traffic beyond the 2028 Midday projections. The other roundabout entries along this corridor have residual capacities of up to 37 percent beyond the 2028 traffic projections.

F. I-95 Main Line Operation

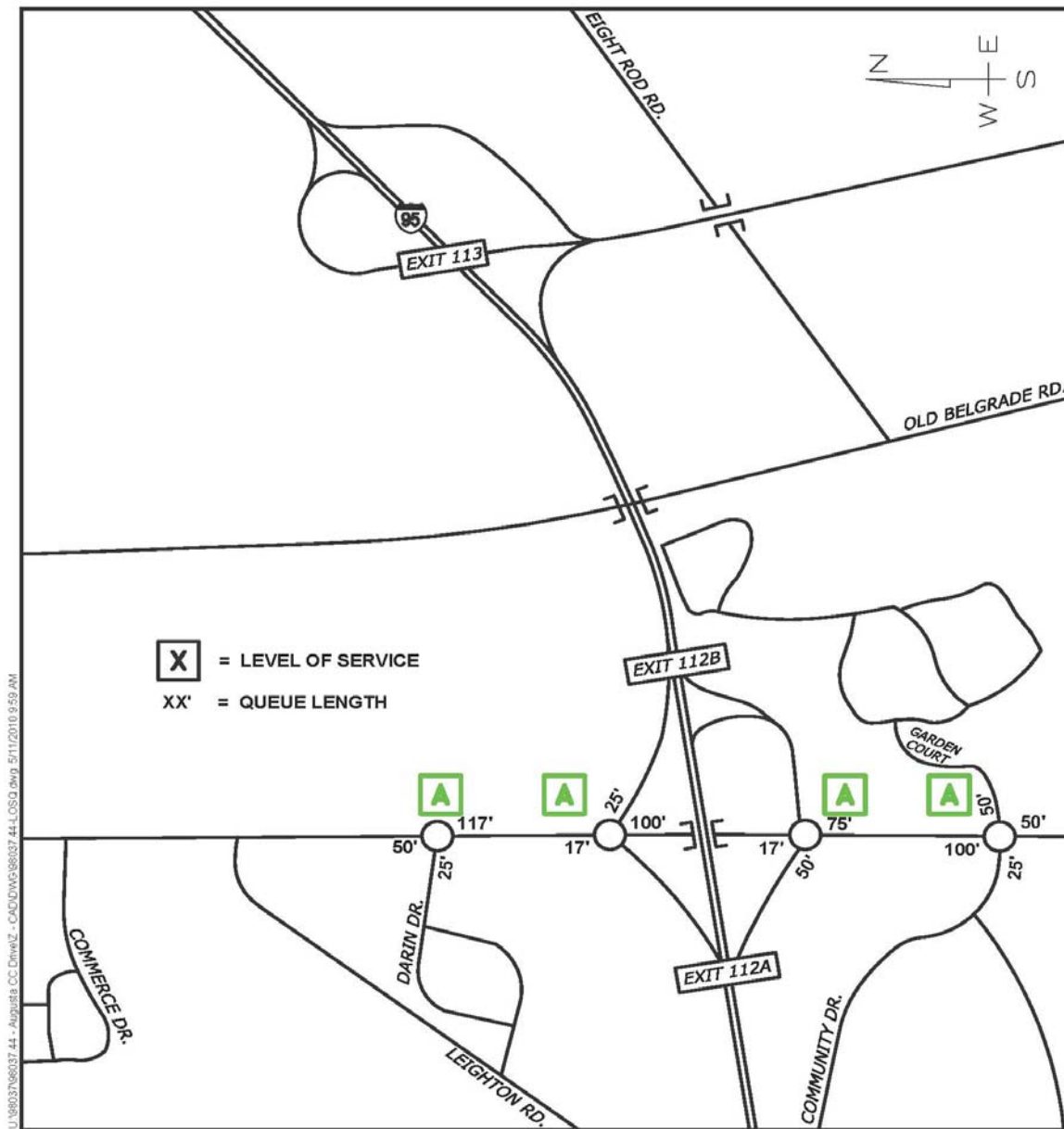
Although I-95 mainline was not specifically earmarked for review as part of this study, it was identified through observations and communications with others in evaluating this area that some drivers are traveling between Exit 112 and Exit 113 via I-95. By drivers doing this, the capacity and safety of both exits as well as the I-95 section between the two exits is reduced. By constructing a full access interchange at Exit 113 onto Old Belgrade Road and to the Route 8/11/27 corridor, this travel between the two exits using I-95 can be reduced. The benefit is realized on Civic Center Drive, which is already at capacity and has high crash locations in the ramp areas. Figures 13 and 14 in Appendix B show a forecast reassignment of traffic due to the construction of a full access interchange to Belgrade Road (Route 8/11/27).

G. Connection to Route 8/11/27

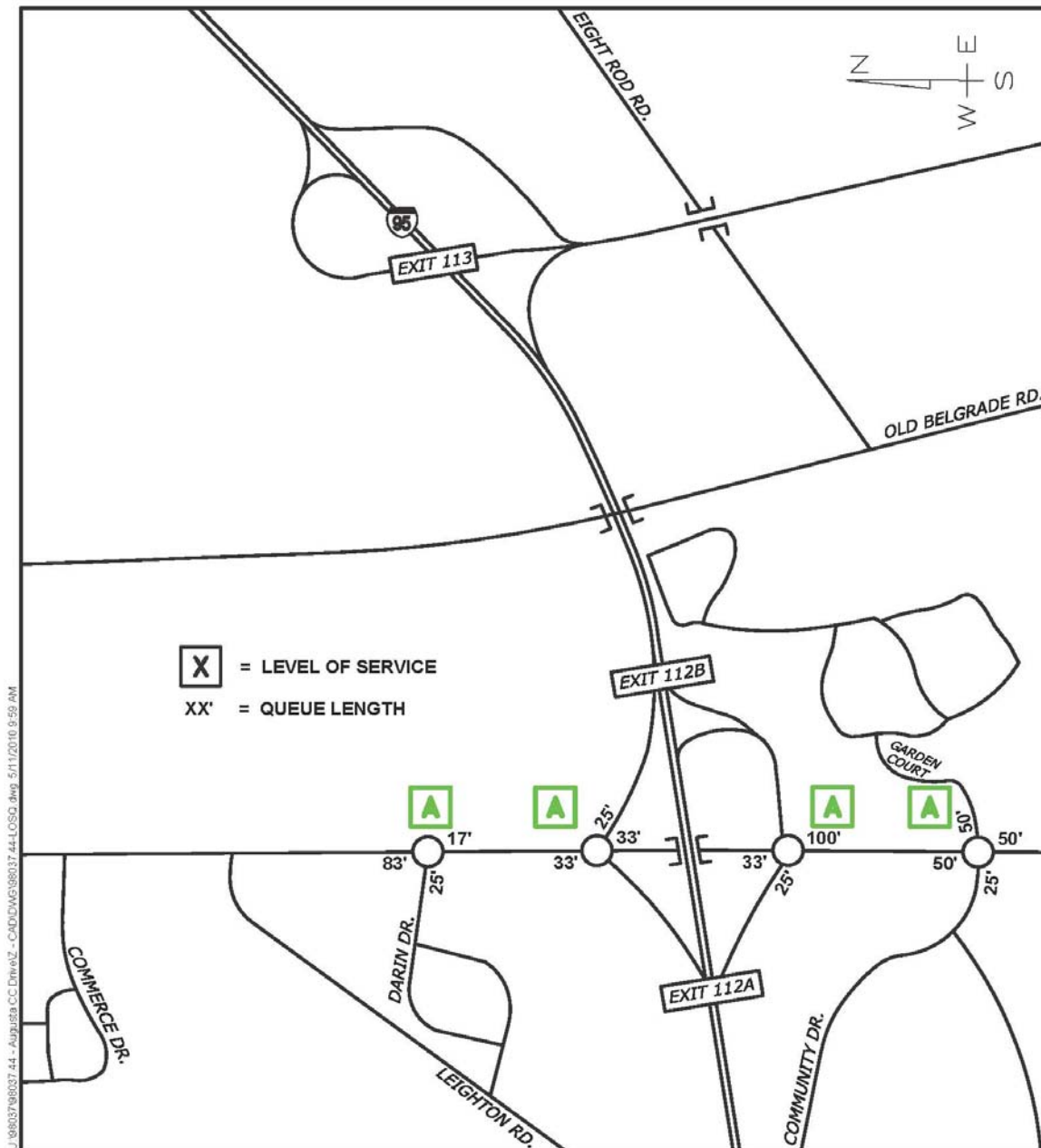
The connection was not specifically earmarked for review as part of this study. It will be reviewed in detail during the EA process.

H. Exit 112 No-Build Versus Exit 113 Build Civic Center Drive Benefits

To demonstrate how the proposed Exit 113 modifications will affect traffic volumes at representative locations along Civic Center Drive in the design year 2028, a traffic volume analysis on the roadway locations at representative intersections with and without Exit 113 Build Alternative was performed. Intersection total entering traffic volumes are forecast to decrease along the Civic Center Drive corridor for the Exit 113 Build Alternative compared to No-Build Alternative in 2028 for the Midday and PM peak hours, as indicated in Table 9. The largest decreases are anticipated on Civic Center Drive from I-95 on/off-ramps north to Gabriel Drive with marginal decreases at Garden Court and Townsend Road. This demonstration highlights the travel demand in the corridor for the Exit 113 Build Alternative above that in the No Build Alternative.



TRAFFIC OPERATIONS AND QUEUE LENGTHS WITHOUT FULL EXIT 113 - ROUNDABOUTS FOR EXIT 112



**TRAFFIC OPERATIONS AND QUEUE LENGTHS
 WITHOUT FULL EXIT 113 - ROUNDABOUTS FOR EXIT 112**

Table 9: Summary of Existing and Projected Civic Center Drive Intersection Total Entering Peak Hour Volume Comparison (with and without Exit 113)

Intersection	Midday Peak Hour							PM Peak Hour						
	Existing Year 2008 vehicles per hour (vph) ¹	Future Year 2028 without Exit 113 Build (vph) ²	Percent Difference Over 2008 without Exit 113 Build	Future Year 2028 with Exit 113 Build (vph) ³	Percent Difference Over 2008 with Exit 113 Build	2028 Vehicle Difference with Exit 113 Build (vph)	2028 Percent Difference with Exit 113 Build	Existing Year 2008 (vph) ¹	Future Year 2028 without Exit 113 Build (vph) ²	Percent Difference Over 2008 without Exit 113 Build	Future Year 2028 with Exit 113 Build (vph) ³	Percent Difference Over 2008 With Exit 113 Build	2028 Vehicles Difference with Exit 113 Build (vph)	2028 Percent Difference with Exit 113 Build
Townsend Road	1994	2727	+37%	2650	+33%	-77	-3%	1807	2480	+37%	2402	+33%	-78	-3%
Garden Court	2742	3691	+35%	3506	+28%	-185	-5%	2538	3507	+38%	3281	+29%	-226	-6%
I-95 NB on/off ramp	2527	4861	+92%	4077	+61%	-784	-16%	2703	4546	+68%	3973	+47%	-573	-13%
I-95 SB on/off ramp	2339	5718	+144%	4565	+95%	-1153	-20%	2479	5421	+119%	4404	+78%	-1017	-19%
Darin Drive	1667	4936	+196%	3823	+129%	-1113	-23%	1657	4360	+163%	3408	+106%	-952	-22%
Leighton Road	1407	4106	+192%	3048	+117%	-1058	-26%	1666	3806	+128%	3056	+83%	-750	-20%
Commerce Drive	1130	3166	+180%	2329	+106%	-837	-26%	1397	3160	+126%	2473	+77%	-687	-22%
Gabriel Drive	925	2419	+162%	1825	+97%	-594	-25%	1229	2544	+107%	1992	+62%	-552	-22%

1 Year 2008 volumes are from Appendix B Figures 5 and 6
2 Year 2028 volumes without Exit 113 are from Appendix B Figures 11 and 12
3 Year 2028 volumes with Exit 113 are from Appendix B Figures 19 and 20

VI. Construction

A. Constructability

The following is a brief description of the constructability of the proposed alternatives:

Exit 112

This area is currently at capacity with substantial volumes of traffic during the peak hours. The proposed alternatives would be extremely intrusive to adjacent developed properties and can be expected to severely impact traffic movement and area commerce during times of construction. Since this exit is the primary access to I-95 in this area, there are few options for alternate detours.

Exit 113

The construction of the proposed alternatives on the west side of I-95 could be accomplished with minor impacts to the adjacent roadway networks or commerce, as the interchange alternatives could be constructed off line and then tied into Old Belgrade Road, Route 8/11/27, and Route 3 extension toward the end of construction. On the east side of I-95, the alternatives are more intrusive to traffic movements than the west side but less intrusive than to the Exit 112 area.

Construction of Exit 113 could be divided into three phases for funding purposes. The first phase would be the construction of the I-95 ramp termini. The second phase would be to construct the connection between Exit 113 and Route 8/11/27. The third and final phase would be the extension of the I-95 Exit 112 southbound on-ramp as a parallel taper ramp to correct the existing geometric deficiencies.

Note, if an Exit 113 alternatives was constructed prior to any Exit 112 construction, the newly constructed Exit 113 could serve as an alternate access to I-95 from the Route 8/11/27 corridor and could potentially reduce the impacts during construction to the Exit 112 area.

B. Preliminary Construction Cost Estimates

A conceptual-level opinion of cost was developed for the alternatives. These estimates are based on unit costs provided by MaineDOT and/or costs that have been historically associated with the items on similar construction projects. The preliminary costs reflect construction cost based on 2008 dollars and do not include design, right of way acquisition, utility relocation, environmental mitigation if any, construction engineering, and maintenance costs over the life of pavement and structures. The estimated conceptual-level opinion of cost for the alternatives is provided in Table 10. The cost data details can be referenced in Appendix K.

Table 10. Preliminary Construction Cost Estimates

	Exit 113 Build*				Exit 112 Build	
	Alternative 1 Traffic Signals	Alternative 2 Roundabouts	Alternative 1A and 2A Upgrade Old Belgrade Road	Alternative 1B and 2B New Highway Connector	Alternative 3 Traffic Signals	Alternative 4 Roundabouts
Construction Costs (million 2008\$)	\$11.0	\$4.9	\$3.5	\$8.3*	\$21.5	\$26.5

* Total Construction Cost for Exit 113 is determined by adding the cost of Alternative 1 or Alternative 2 to the cost of Alternative 1A or 1B or 2A or 2B.

VIII. Summary

A. FHWA Justification Requirements

FHWA has adopted a series of eight policy issues for new or revised access points in the Interstate Highway System. These policies were published in the Federal Register, Volume 63, Number 28, dated February 11, 1998. This series of policies is intended to protect the capacity and safety of travel along the Interstate System by maintaining the highest level of service in terms of safety and mobility. Adequate control of access is critical to providing such service. The following paragraphs describe how the I-95 and Route 3 Interchange modification complies with the FHWA policies.

Policy Criteria No. 1: Existing Facilities

The existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design-year traffic demands while at the same time providing the access intended by the proposal.

The existing Exit 112 ramps to/from I-95 and the immediate corridor along Civic Center Drive are currently at capacity with queuing issues, safety concerns and reduced effectiveness for emergency response. The proposed Exit 112 alternatives right-of-way impacts would be extremely intrusive to adjacent developed properties, would substantially reduce the city of Augusta's taxable properties and can be expected to severely impact traffic movement and area commerce during times of construction. Since this exit is the primary access to I-95 in this area, there are few options for alternate detours.

Policy Criteria No. 2: Transportation System Management

All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included for accommodating such facilities if a future need is identified.

Section IV of this report discussed the reasonable conceptual alternatives considered to address the purpose and need for this project. The reasonable alternatives considered included the no-build alternative, using other modes of transportation and a series of build alternatives.

The projected traffic increase at Exit 112 cannot be absorbed by additional TSM and TDM strategies; therefore, the TSM and TDM Alternative would not be a viable solution to accommodate future traffic needs in the study area.

Policy Criteria No. 3: Operational Analysis

The proposed access point does not have a significant adverse impact on the safety and operation of the Interstate facility based on an analysis of current and future traffic. The operational analysis for existing conditions shall, particularly in urbanized areas, include an analysis of sections of Interstate to and including at least the first adjacent existing or proposed interchange on either side. Crossroads and other roads and streets shall be included in the analysis with new or revised access points.

As demonstrated by the traffic operations analysis presented in Section V of this report, the proposed extension of Exit 113 interchange would not degrade the operations of I-95 mainline or the operations of the Exit 112 interchange. Exit 113 resulted in improved operations compared to the No-build conditions.

Policy Criteria No. 4: Access Connections and Design

The proposed access connects to a public road only and will provide for all traffic movements [except in only the most extreme circumstances, as will be explained later in this document]. Less than “full interchanges” for special purpose access for transit vehicles, for HOV’s, or into park and ride lots may be considered on a case-by-case basis. The proposed access will be designed to meet or exceed current standards for Federal-aid projects on the Interstate System.

The proposed interchange would connect to Old Belgrade Road and Route 8/11/27, which are public roads and the ramp terminals will provide access to all traffic movements. The recommended interchange design will meet all AASHTO criteria, including “A Policy on Geometric Design of Highways and Streets” and “A Policy on Design Standards – Interstate System”.

Policy Criteria No. 5 Transportation Land Use Plans

The proposal considers and is consistent with local and regional land use and transportation plans. Prior to final approval, all requests for new or revised access must be consistent with the metropolitan and/or statewide transportation plan, as appropriate, the applicable provisions of 23 CFR part 450 and the transportation conformity requirements of 40 CFR parts 51 and 93.

The proposed interchange improvement is consistent with local land use plans. The City of Augusta has recently approved a revised comprehensive plan that not only envisions and supports the extent and type of development taken into account for this study, but also favors the enhancement of Exit 113 to a full service interchange able to accommodate all desired traffic movements. Furthermore, in regards to regional transportation planning the Kennebec Valley Council of Governments was consulted and they have confirmed that they addressed the reconfiguration of Exit 113 in their most recent Six Year Plan submittal to MaineDOT, fiscal year 2010-2015 Multimodal Six-Year Transportation Capital Improvement Plan. In that document they endorse enhancements to Exit 113 to make it a full service interchange that accommodates all traffic movements and possible connection to Route 8/11/27.

Policy Criteria No. 6: Comprehensive Interstate Network Study

In areas where the potential exists for future multiple interchange addition; all requests for new or revised access points must be supported by a comprehensive Interstate network study with recommendations that address all proposed and desired access within the context of a long-term plan.

Exit 113 is already a functioning interchange although full access is not provided. The purpose of the proposed interchange reconfiguration is to accommodate local and regional access to I-95 from the west without requiring drivers to travel through other intersections that are already over capacity.

Because Exit 113 is already a functioning interchange, no requests for additional interchanges are anticipated at this location beyond that included in this report.

Policy Criteria No. 7: Coordination with Transportation System Improvements

The request for a new or revised access generated by new or expanded development demonstrates appropriate coordination between the development and related or otherwise required transportation system improvements.

The proposed Exit 113 interchange modification is being requested to address safety needs, accommodate future traffic growth, and provide system redundancy. The full interchange will also help accommodate existing and projected development in the vicinity of the Exit 112 and Exit 113 interchanges.

Section I. F. *Agency Coordination and Public Involvement* documents the coordination that has occurred to date.

Policy Criteria No. 8: Status and Information on the Planning and National Environmental Policy Act (NEPA) Process

The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.

An EA is currently being prepared by MaineDOT for a reasonable range of Exit 113 interchange alternatives presented in this draft IJR. Furthermore, the EA will also cover the connection from Exit 113 north to Route 8/11/27.

Much of the information developed for this draft IJR is important to the analyses required to complete the project's environmental documentation. The conceptual design, traffic forecasting and traffic operations analysis work are key inputs that will determine the environmental implications that might occur with implementation of the proposed project. Thus, the work completed so far on this document is a building block for continuing work on the environmental document, contingent upon approval of this request. When a preferred alternative is selected from the NEPA process, a final IJR documenting the traffic operations of the preferred alternative will be prepared and submitted for approval. The EA decision making document, which will contain the preferred alternative.

B. Conclusions and Recommendations

As demonstrated, the Route 8/11/27 corridor and Exit 112 interchange ramps are currently experiencing operational and safety issues due to chronic traffic congestion. The congestion driven safety issues are exacerbated by the local access in close proximity to the series of signals along the corridor. It is anticipated that the congestion will intensify with the current and proposed level of planned development.

Based on the analyses conducted in this IJR it is recommended the following alternatives be forwarded to the NEPA process.

3. Exit 113 is developed into a full service interchange with a connection from Route 3 to Route 8/11/27. The access for the new Route 3 extension be planned to compliment existing and projected development, as well as, have limited access control to promote safety and mobility both locally and regionally. In addition, it will provide system redundancy for the local and regional transportation system which is currently inadequate.
4. Roundabouts at Exit 113 are recommended as the preferred type of intersection at the ramps as depicted in Section IV. D. 2028 Build Alternatives Exit 113 and in Figure 16 Based on the modeling, it is expected that the roundabouts will provide better mobility and safety performance than the traditional signalized intersections.

In addition to the Exit 113 modification, the following safety improvement is recommended at the Exit 112 interchange:

- Reconfigure the southbound on-ramp as a parallel taper ramp to correct the existing geometric deficiencies.

C. Next Steps

All requests for new or revised access points on completed Interstate highways must be closely coordinated with the planning and environmental processes. The FHWA approval constitutes a Federal action, and as such, requires that the NEPA procedures are followed. The NEPA procedures will be accomplished as part of the normal project development process for this project and as a condition of the access approval. This means the final approval of access cannot precede the completion of the NEPA process.

However, to offer the maximum flexibility to State Highway Agencies (SHA), any proposed access points can be submitted in accordance with the delegation of authority for a determination of engineering and operational acceptability prior to completion of the NEPA process. In this manner, the SHA can determine if a proposal is acceptable for inclusion as an alternative in the environmental process. This policy in no way alters the current NEPA implementing procedures as contained in 23 CFR 771.

Formal environmental studies are ongoing and have not been concluded for this study. An environmental analysis of the study alternatives from this report will be concluded prior to the project moving forward. The purpose of the environmental analysis is to evaluate the alternatives based on the project purpose and need as well as analyze and identify the level of social, economic and environmental impacts that would be expected to result from each alternative.

Once granted, approval for new or revised access points on completed Interstate highways is valid for eight (8) years. Supporting data and analysis must be updated every ten years until the entire project is complete in order to maintain that approval.

At this time, funding has not been identified for design, right-of-way, or construction for the proposed interchange improvement. There is strong support from MaineDOT, FHWA, the City of Augusta, and other project area stakeholders to acquire funding for this project. MaineDOT will continue to work cooperatively with all stakeholders to establish state and federal funding sources that could be paired with local money to support the interchange improvement recommendation.